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Psychologist Views 'Insecurity' at DP Centers

By Tom Morton
CW Midwest Bureau

CHICAGO – In protecting both the information stored in his computer systems and the reputation of data processing in commerce and industry, the DP manager faces a battle in which four psychological factors weigh against him, according to a Chicago industrial consultant.

Dr. Robert W. Varmin, educator, behaviorist, and lecturer who consults with national firms on employee behavior patterns and motivational techniques, said: "I would consider the typical data processing operation most susceptible to a variety of loss potentials including theft, embezzlement, accidental data loss, malicious mischief, and deliberate espionage."

Four Factors

Varmin bases his claims on four factors of human characteristics of people involved directly or indirectly with data processing. "Taking a look at the whole situation," he said, "we find a lack of thorough understanding, an indefinable intangibility, a defeating preconditioning towards security, and 'a something' I must call, for lack of a better term, 'the bleep-bloop syndrome.'"

Other Facets Unfamiliar

Varmin explains his interpretation of a lack of understanding by maintaining that the DP employee, while retaining a level of competence in his own field tantamount to the station or level he has attained in his field, is not familiar with the other facets of the business in which his own company exists and competes.

"The converse is also true," Varmin claimed. "Do the other departments and sections in a business organization really understand what actually takes place in their own DP department? Do they understand the particular problems of data processing? The real or imagined stresses under which the DP personnel must function? I think not."

"Every company I can think of has, no matter what his actual title, a high-ranking executive whose responsibility is that of marketing," he added. "This executive will participate in every function of the business organization, at least on the 'staff meeting' level. He participates in matters of finance, research and development, planning, production or manufacturing as well as in his own functions of sales, market research, and promotional activities.

"Yet how many companies

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'Public Need'

FCC Report Endorses Specialized Carriers

By Michael Blake
CW Washington Bureau

WASHINGTON, D.C. – The Federal Communications Commission, in a major statement designed to foster the growth of special service common carriers, said these carriers "would help meet the increasing need for diverse and flexible means for satisfying and expanding specialized communications requirements."

The statement, in effect, gives commission support to the type of data communications services proposed by Microwave Communications Inc., (MCI), Data Transmission Co. (Datran), and others who have filed applications to offer communications services to data users in direct competition with existing common carriers such as AT&T.

In encouraging entry of the new services, the FCC's common carrier bureau said it sees no merit in the argument of existing carriers that the applicants for new systems are simply seeking to "skim the cream" of the most profitable markets or routes now being served by the Bell System and Western Union.

The bureau emphasized that the applicants seeking to provide new services to data communications users are seeking to develop new communications markets rather than exploiting existing markets now being served adequately by the established carriers.

The commission said it proposed not to hold comparative hearings on issues of economic exclusivity noting that there seems to be "sufficient market potential to support more than one applicant in an area."

This proposal would serve to expedite the applications now before the commission that are being challenged as being economically un-needed by the existing carriers such as AT&T and Western Union.

Pointing out that it is taking no position on the common carrier bureau's proposals at present, the FCC asked for comment on the procedural and rules-making proposals from interested parties by Oct. 1.

Frequency Conflicts

To expedite the pending service applications, the FCC proposes to require applicants to remove frequency conflicts with existing common carrier stations and to avoid blocking expansion of existing common carrier routes to the extent practicable.

The Commission also invited applicants and other interested persons to submit comments on the most appropriate means for a local or intercity distribution of the proposed services, including such questions as interconnection with existing local carriers, whether new construction would be required, and if so, of what nature, and by whom.

Once these issues have been determined, the FCC said it will consider each system proposal

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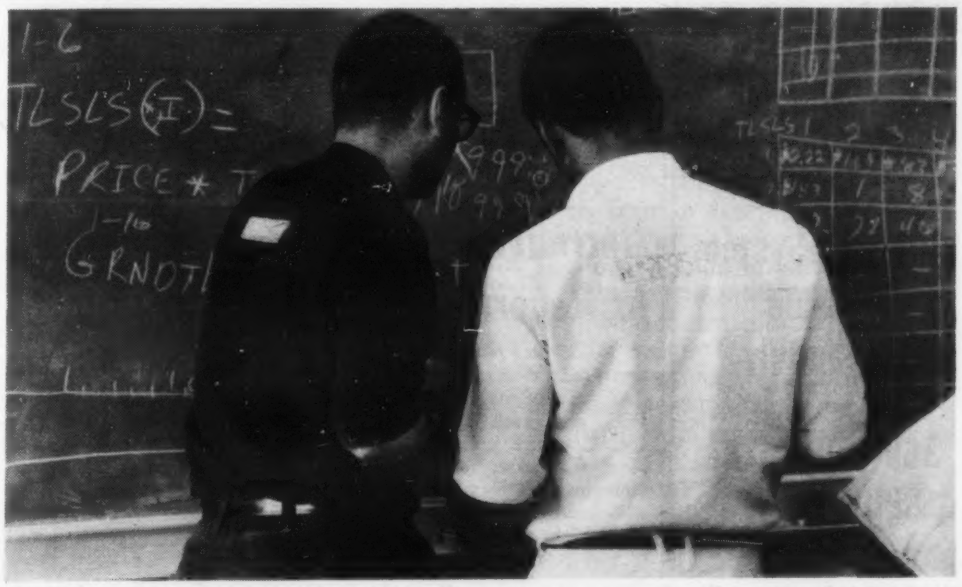
On the Inside



Since the convict programmers do not have direct access to a computer, all programs that they write are run through the "blackboard" computer before they are given to the state agencies.

'Blackboard' Computer Enables Prisoners to Program for State

By Michael G. Pruett
Special to Computerworld

FLORENCE, Ariz. – For the past three years, a group of 12 inmates at the Arizona State Prison have been working 10 to 14 hours a day on a job which saves the taxpayers of Arizona approximately $100,000 a year.

Through the joint efforts of the Arizona State Prison authorities, the Arizona Department of Public Instruction and IBM, the door to a career in computer programming was opened for the inmates at the prison when a data processing center was formed here in November, 1967.

The purpose of the center was to provide instruction in the basics of computer technology, with the main emphasis on preparing inmates to write computer programs. It was hoped that this training would point these men in the right direction towards self-motivation and rehabilitation.

However, the scope of Arizona Data Accessing, Programming and Training (Adapt) has expanded greatly since its start.

Actual Experience

After the initial training period was completed, several Arizona state agencies expressed a desire to give the programming group small test programs to write so that they might have actual programming experience. These first agencies were the Arizona Highway Department and the Maricopa County Junior College District.

The caliber of work turned out by the group was good enough to merit a change in the entire concept of the program. Up to this point, all training had been designed to provide an inmate with a basic understanding of data processing and computer programming.

It was hoped that upon release from the prison these men would then be able to use this knowledge to gain a job as a programmer trainee. The success of the program has now deemed it necessary to separate the program into two functions. One function would be the training of new men; the other function would be the writing of actual production programs for state agencies.

At this time nine state agencies are using the services of the programming group. These agencies include the state Departments of Corrections, Game and Fish, Finance, Public Instruction, Highway Department, the Maricopa County Junior College District, and the Arizona State Hospital.

Lee Albertson Jr., systems and programming manager for the Arizona Highway Department, commented on the convict programmers: "In the period of time from April, 1969 until now the programming group at the Arizona State Prison has progressed a decade in the field of

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Psychologist Views 'Insecurity' at DP Installations

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have their top DP man on the same level even though DP plays an ever-increasing role of importance in that company's total operations?" Varmin asked.

"That very same marketing vice-president, for sake of an example, could turn over to a data processing department information of such a highly confidential and valuable nature that it has taken four memos and three receipts to get it out of the marketing division," he said.

"And who does he turn it over to? Persons who probably have no idea of its intrinsic worth. Persons who were not included in the discussions of its potential. Persons who, no matter what his admonitions are to the contrary, are very apt to consider it 'just another job to be loaded.' And worst of all, persons who that marketing executive really doesn't know, except perhaps as employees of the same company, doesn't understand, and doesn't want to have to take the time to understand.

"As a rule, he places that information into data processing to achieve an objective he needs. He has no idea what takes place to produce that objective. That objective and the time it takes to achieve it are his only concern.

"So what we end up having," Varmin said, "is a potentially very dangerous situation. The metaphor is not too good, but the situation is not unlike giving an infant a $10,000 bill. The child would be just as apt to eat it or throw it out a window as he would be to guard it carefully. Again, I say the metaphor is not exact, but who would be at fault?"

Second Factor

Varmin claims that the lack of understanding contributes to a second factor in his determination of the susceptibility of DP departments to theft and espionage.

"Take our friend the marketing manager again," he said. "He wants a computation of his total sales on a given line of supply products for a period of some past few years. The DP department, with all the information and records of the company at its disposal, can readily provide our friend with just that information. When our friend receives the printout, that compilation of information from many sources within his company, he may very well guard that printout with his very life. That would be priceless information to his direct competition, and a priceless commodity to the unscrupulous.

"He may never let the printout out of his sight, but what orders does he send back to the DP department? From my experience, I would say none. I don't believe that marketing man actually knows that very same information exists in another form. That man may not realize that if a printout was produced for him it can be produced again unless he or a DP executive takes steps to see that it cannot.

Intangible Information

"If our marketing friend actually visits the DP operation, he won't see that compilation of information. He may see a tape or a memory unit or a data cell series, but he cannot actually place that information into his hands. He is stifled in an effort to 'see' that information in any form he can recognize. The information is in an intangible state.

"To the marketing man it is as safe as if it were contained in a human brain. In that assumption he errs. The computer is not as discerning as the human brain; it will tell anyone, no matter what that person's motive, everything it is instructed to tell.

"Of course, the same intangibility affects the data processing person too. But in a very different way. He is accustomed to his equipment, he understands that it contains information. His whole working life is surrounded with information that is in machines, on tapes, stored and collated in a variety of intangible ways. The intangibility is not in the information to him; it is in its effective use.

"I know of a case in which an analyst, demonstrating his operation for some visitors, took a tape at random and produced a printout showing the names and addresses of all the employees of his company. He even demonstrated the remote terminal and produced a printout in some branch office somewhere.

"My point is that he took the tape at random, out of a storage cabinet containing some highly confidential, and therefore valuable, information. That is a department in which the disastrous is only waiting to happen."

Varmin claims that industry is more inclined to value the equipment in a DP operation than the information that equipment contains. The information, Varmin says, does not exist while it is in memory or on tape, "not as we humans are conditioned to think of information. The special sauce a wife makes is a product, the recipe is the information, the ability to make it is knowledge. The product can be analyzed and copied, the recipe can be duplicated, the knowledge is inviolable. So, we presume, is the 'knowledge' in a computer system.

The DP man realizes the information exists, but he is, according to Varmin, conditioned to consider it useless without his abilities to produce it in tangible form. Neither, according to Varmin, consider the computer-contained information unsafe. The layman, like the marketing man, cannot obtain it and so, humanly, presumes others like him cannot.

The professional considers it obtainable only through him and therefore safe because of his own integrity, which he assumes is a general characteristic of data processing personnel.

Industry Like Club

"The situation reminds me," he said, "of the enterprising company of some 10 or 15 years ago which developed and tried to market a lock for skis. They nearly went under, because their advertising kept insisting that the locks were to be used to protect skiers from the theft of their equipment by other skiers. When they changed their advertising to hint that skis could be stolen by non-skiers, their locks started to sell. No skier would admit that a participant of this elite and gentlemanly sport would stoop to pilfering a set of skis from another elite gentleman.

"Remember, too, that the first automobiles did not have locks on their ignition systems. Now an ignition lock does everything but tie a huge chain around the parking meter.

"When you come right down to it," Varmin said, "how is it possible to steal a 'bleep' or a 'bloop' out of a computer, and I don't mean technically? What, actually, is stolen? A reel of acetate? A pound of paper 11 in. wide? What? No, it is 'knowledge' that is stolen.

"Let's take a hypothetical case. The complete computation of a research project for the development of a new hardware product could be, in effect, copied in a variety of forms and given to a competitor . . . for profit or for vengeance.

"Would our friend the marketing manager think to blame the appearance of a competitive product similar to the one he had in development on a security leak in the data processing department? I would doubt it.

"Would the DP manager think to blame his own department? Would it even cross his mind? Would he even be concerned enough in total company operation to care what the competition had produced? Again, I doubt it.

"The data processing industry is," Varmin stated, "guilty of producing a heretofore unheard of phenomenon: the ability to allow a thief to steal something he leaves behind."

The DP operation, according to the doctor, is not immune to accidental loss based upon the four factors he mentions. He cited the story of a young programmer, addicted to neatness, who coiled the long cord of an extension lamp in a DP department's file storage room. "That coil created a home-made electric magnet," Varmin said, "which made walking the floor of the storage room easier, perhaps, but also wiped out three stacks of stored tape."

Human Foibles

"All of these factors are not peculiar to the data processing industry within industry alone. They are common, everyday human foibles," Varmin continued. "Take the pharmacist who refuses a drug addict a certain medication because the addict doesn't have a proper prescription. That druggist knows that the ingredients of that medication are available to the addict without a prescription within medications on his shelves.

"Like medications on a drug store shelf, information in a computer is available to those who want it for unscrupulous purposes. Like the drug industry, the DP industry should consider those steps necessary to prevent the obtaining of information for wrongful purposes."

When queried as to what steps he would recommend, Varmin said, "I didn't even know how to stop people from breaking down harmless medications to obtain the ingredients for the harmful ones. That I left to the chemists. Computer safety I leave to the computer experts."

'Increasing Public Need' Mentioned In Report Backing Carrier Entry

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on its individual merits.

As part of its proposals, the FCC said each applicant for special service common carrier "will, of course, be required to make a satisfactory showing that it is qualified and that the service it seeks to offer is technically and economically sound and would otherwise serve the public interest."

In declining to hold comparative hearings on the economic aspects of each individual case, the bureau noted that Datran's proposed system should, in any event, be considered separately from the other applications because of its (Datran's proposal) singular characteristics; an all digital, switched network dedicated exclusively to data transmission service.

At present, the FCC is considering applications from more than 30 organizations that propose to establish a total of more than 1,400 microwave transmitting sites. Each microwave site is considered to be a separate application to the commission.

The major applicants include MCI which proposed to configure a national network based on separately owned regional links, and Datran which has proposed a complete digital switched network to serve initially 35 major cities.

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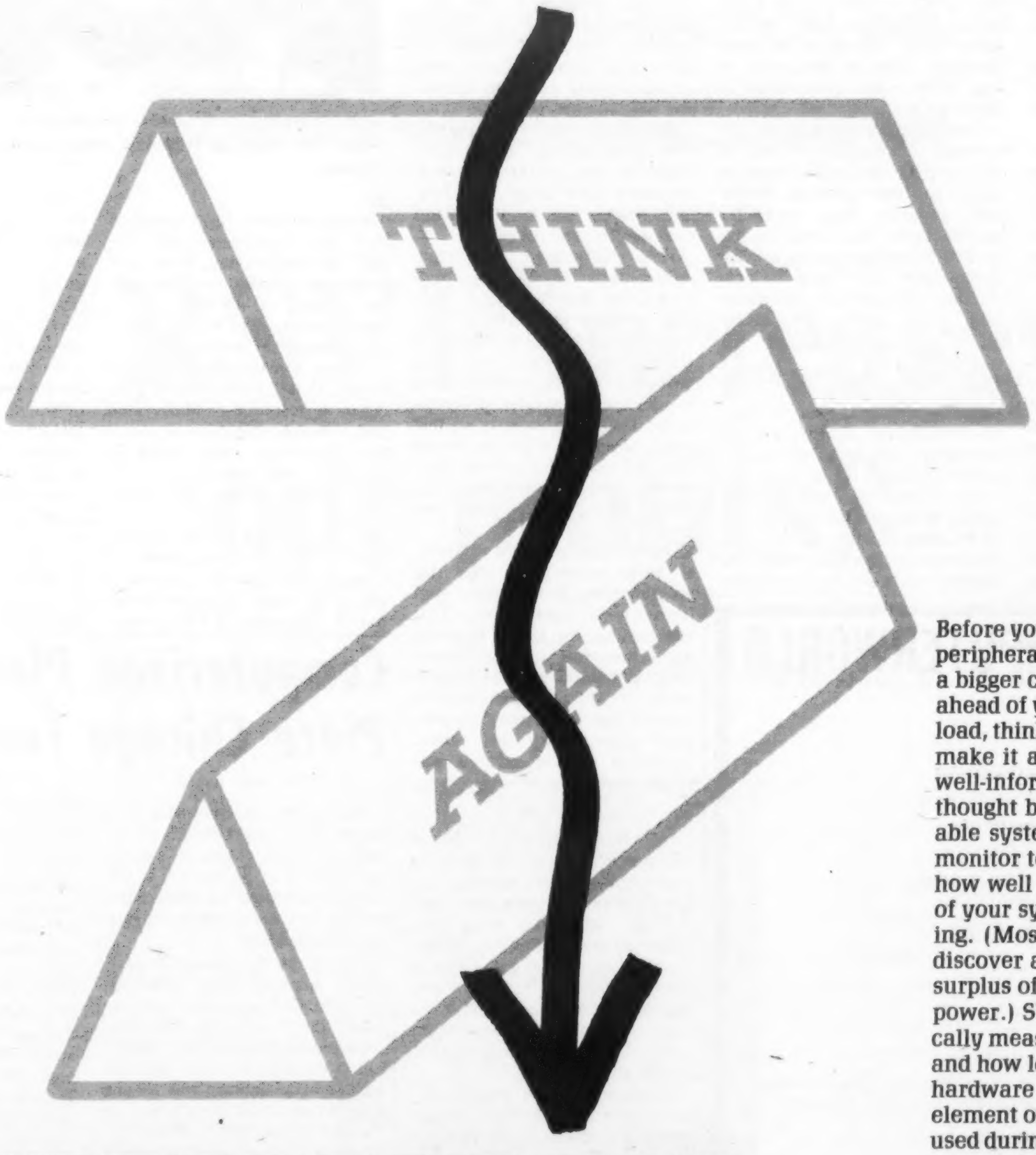

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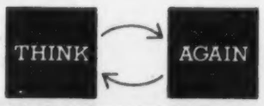

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Prisoners Program for State Agencies In Arizona Under Expanded DP Course

(Continued from Page 1)

EDP. From the initial programming efforts of formatting records for print routines, the assignments now include the development of proof and file maintenance programs, and in the embryo stage, computer systems design.

"The systems and programming section at the Arizona Highway Department has worked with this group in the classical sense of computer systems development. The systems flowcharts are reviewed by Adapt before the detail program specifications are delivered to the prison.

"This insures that the individual programs will meet the overall system requirements. The flowcharting, program code, syntax and logic debugging (many programs run the first time) and program documentation are the components that are developed by the inmates.

"We use the network technique for planning and scheduling system design activities. Therefore, the demands on this group are within a real world fixed timeframe environment. The inmates have responded to these demands, they are dedicated to the effort, and they show a desire to learn.

"Having 'lived' through the traditional occupational hazards of data processing (crash programming, hardware changes, persistent program bugs, compiler malfunctions) the group has extended our programming arm by completing more than 50 production programs," Albertson said.

Types of Programs

The types of programs being written by the group are payroll, property control, boat registration, statistical reports, manual inventory, data compression, file conversions and file updates.

The 12 men who make up this center were selected from a field of 40 inmates who took the IBM programmer aptitude test. The inmates selected had sentences ranging from one and one-half years to life. The purpose of selecting some men with life sentences was to insure that a staff of instructors would be maintained at the prison to carry on the training program for future participants.

The initial training program was conducted by IBM systems engineers and marketing representatives who made the 140-mile round trip to the prison each day to conduct classes.

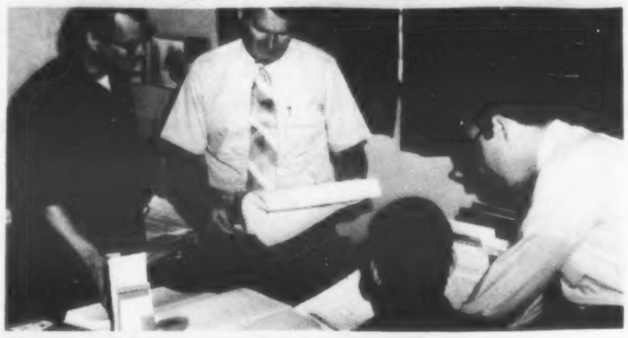
Glen McDermed, marketing representative for IBM who originated the idea for Adapt, said: "Before the project started there was some doubt that these men would devote the extra time needed to study something as complex as computer programming. These doubts were washed away, however, when we found that the men were missing their once a week movie so that they could stay in their cells and study."

The inmates have had additional basic training in computer programming from Univac and Honeywell instructors. This training has equipped them to write programs for the Univac 9300 and 9400 and the Honeywell H-200. Supplemental courses have been taught as the need arose; the most recent course in control systems was taught by Univac.

Self-Study

Teaching materials are kept at the prison so that the inmates may train new men coming into the program. The new men learn through self-study using programmed instruction courses and formal classes taught by the more experienced men in the group. A reference library is kept at the Adapt center for each of the computing systems taught to the group.

The work of the inmate programmers is guided by professional systems analysts from the state agencies who make weekly trips to the prison center. Also, a telephone has been installed in the center to enable two-way communication between the programmers and the state agencies.



Jack Stanton, center, and Mike DiMarco, "potential customers" from the Arizona Highway Department, explain the payroll system.

Provisions have been made so that the programmers are "on call" 24 hours a day. Thus, any problems which develop with the running of a program they have written can be solved by the programmer responsible.

"These inmates have demonstrated that they treat their privileges as resources," McDermed said. Privileges include the use of the telephone, night work as required, and minimum custodial supervision in the Adapt center.

Dr. A. LaMont Smith, deputy director of the Department of Corrections, said the project is one of the most valuable rehabilitation programs at the prison.

"The inmates who participate in this program are learning not only programming skills but management skills as well. This includes how to establish priorities, accepting responsibilities, managing resources, and meeting deadlines."

Perhaps this statement by Smith best sums up the effects of the Adapt program upon the inmates. Men in prison are there because they could not, or would not control certain portions of their lives. The institutional environment coupled with the professional association in the EDP "real world" and its demanding requirements appear to be the proper blend for re-motivation and rehabilitation.

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Computerized Plan Would Place Chicago Teachers

CW Midwest Bureau

CHICAGO – A computer may decide where the teachers in the Chicago public school system will work next September if the recommendations of the federal government are adopted by the school board here.

A year ago the Justice Department imposed two demands upon the Chicago schools: desegregate the faculty and distribute experienced teachers more equitably throughout the system. Justice officials have warned the school board that there has to be "some meaningful desegregation" in Chicago or Justice will sue under the Civil Rights Act.

The computer would be fed the number of the system's teachers, the race of the teacher, teacher certification, the seniority of each teacher and would then plot the equitable distribution of the city's some 20,000 teachers through the 600 schools.

Presently, the system has 215 schools with either all-white or all-black staffs. The desegregation plan was developed over the past six months by the U.S. Office of Education and by private consultants. The Chicago School Board is not required to accept the federally developed plan, but must comply with the Justice Department's demands or face the lawsuit.

Other school systems, faced with similar circumstances, resorted to the use of a lottery to place their teachers. The computerized plan was recommended by the government to avoid any possibilities for bias

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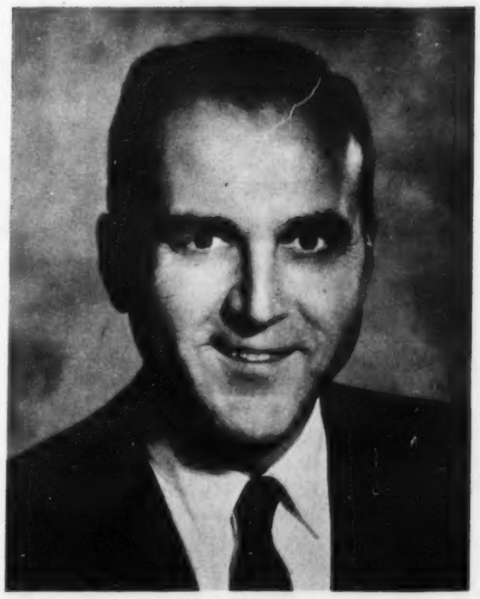

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MIT Fails in Attempt to Shift Research From Military to Civilian Applications

CAMBRIDGE, Mass. – MIT's attempt to shift computer research from military to nonmilitary applications has failed. Lack of money for civilian projects, plus a desire to continue military research, caused the failure.

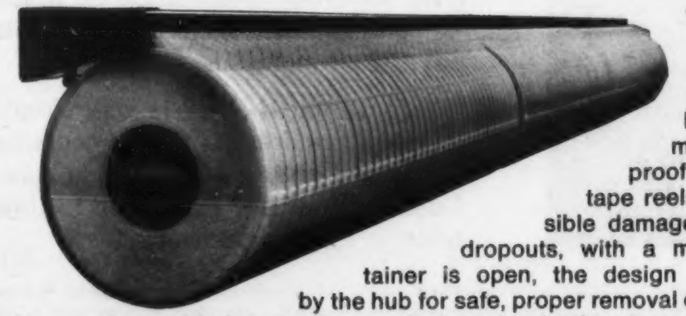
The MIT Draper Laboratory (Instrumentation Laboratory) is responsible for the computerized guidance systems of both Apollo spacecraft and multiple warhead missiles. Last year [CW, Nov. 5], the lab came under strong attack from students and faculty for its military ties.

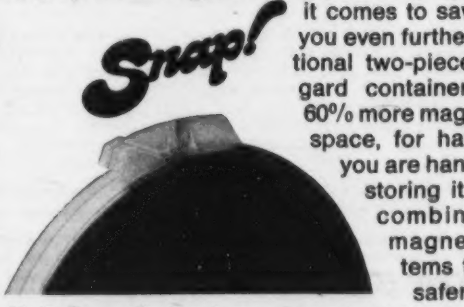
MIT responded by firing lab director and founder Dr. C. Stark Draper (renaming the lab in his honor) and announcing a plan to convert the lab to civilian work. Faced with strong objections inside the lab and a lack of money for other projects, MIT recently gave up that plan.

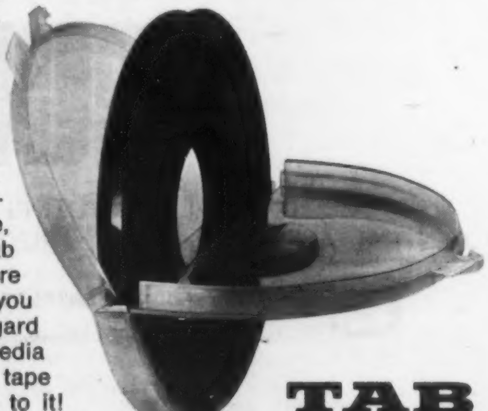
Draper was reinstated as head of the lab, and MIT has begun the process of "spinning-off" the lab as a separate corporation.

Charles Miller, associate dean of the School of Engineering, who was named head of Draper Laboratory last fall, will now return to his previous job as head of MIT's Urban Systems Laboratory, and attempt to expand it in civilian areas.

Miller is a systems analyst who has led the civil engineering field in the applications of computer techniques to complex urban problems such as transportation, water resources, and construction.







Product Safety Report Gathers Accident Data

WASHINGTON, D.C. – The National Commission on Product Safety (NCPS) has just concluded a two-year project, during which the commission used computers to analyze accidents involving various types of consumer products.

The central computer at the General Services Administration (GSA) was used in the test, communicating with telephones strategically situated in 14 hospital emergency rooms. Data was collected to inform NCPS which products of the 350 tested were most often involved in serious accidents.

NCPS claimed that the most efficient reporting method, and least subject to human error, was by Touch-Tone telephone. The same style telephone that is used in many homes was used to transfer coded information on product-related injuries to the IBM 1410 at GSA.

The information was then processed through a program created by NCPS engineers and public health specialists to ultimately assign a "frequency-severity index" to each of the 350 products.

'In the Average Case . . .'

NCPS described the "average" accident and the method used to collect the data as follows:

A woman was brought into a hospital emergency room with cuts of the lips, neck, ear, and face. She had been shopping when a soda bottle in her cart exploded.

The hospital admitting clerk took the usual medical information with just one addition: what, if any, product was involved in the accident. At the end of each day the person who would transmit the information by Touch-Tone telephone reviewed the admitting cards and assembled those cards that did name a product.

This information, however, only revealed *which products* were *involved* in accidental injuries – *not* that they *caused* the accident. Teams of special investigators are following up on those products which rate high on the frequency-severity index. Trained investigators interview the victim, verify the coded information, check out the product and circumstances of the accident.


MEMOREX QUANTUM CX
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CERTIFIE

Survey on OCR Equipment

Users Willing to Wait for Right System Design, Price

By Peter L. Briggs

CW Technical Research Editor

Utilization of optical character recognition (OCR) is becoming a major concern voiced at users' meetings and company planning sessions, but a recent CW survey of large- and medium-scale users indicates they would prefer to "hold off a while" until the "right" gear with the "right" system design will be available at the "right" price.

The major drawbacks cited by potential users of currently available equipment are high prices and lack of flexibility.

Few of the large OCR equipment manufacturers, such as Control Data, IBM, Recognition Equipment, Burroughs, and NCR, appear to have aimed their products at what the users have described as their needs.

Users want machines that can be easily changed to fit new applications, are fully supported by operating software, are priced in reasonable proportion to their work capacity, and are more easily maintained.

High Price

The biggest complaint among the 30 users interviewed was the high price. This price was measured not just as hardware but as a combination of the high rental prices and the large software investment required to use them.

Users feel that OCR should be like any other peripheral device – simple commands, standard I/O interface, and built-in logic to simplify interface with higher-level languages like Cobol or PL/1.

Some users pointed out that the logical "ideal" is a combination of OCR and microfilm. Many large users said they would be much happier with microfilm if they had some means of getting it back into the computer at high speed.

An optical reader should be able to handle microfilm as easily as document input. This does not represent the broadest application but is of real interest to many users.

The application most desired is that of source-location document input – equipment that will read typewritten or hand-printed documents at the remote source of the documents, convert the data to standard computer codes, and transmit this data to a central computer. Several such devices oriented around a single transmission station are considered highly desirable.

Users are unwilling to pay more than $700 or $800/mo currently for large OCR systems and more than $200/mo for remote systems. They expect this cost to decline to under $200/mo for large systems and under $50/mo for remote systems by 1975.

Some users pointed out that their reasoning for these prices was based on what conventional methods are costing them, and the possible system gains through direct input.

OCR

Others were less optimistic about OCR, however. They expressed a fear of the reliability and eventual cost-effectiveness of any highly complicated device such as the OCR scanners.

Most large OCR systems include a minicomputer to handle image decoding, or require full-time access to a large central processor. The minicomputer-based systems have an advantage – they can be run as effectively off-line as on-line. This decreases the overall cost, even though the unit price might be higher.

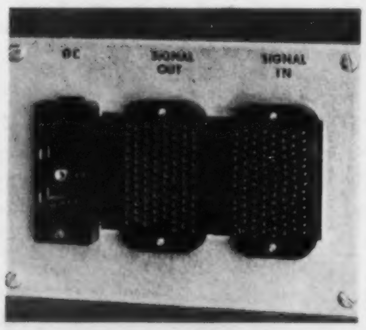
Remote systems at present must depend on central processors for image decoding. There is a danger of transmission errors, and this is magnified by the potential error rate of all optical equipment. It just gets dirty when it isn't cleaned often.

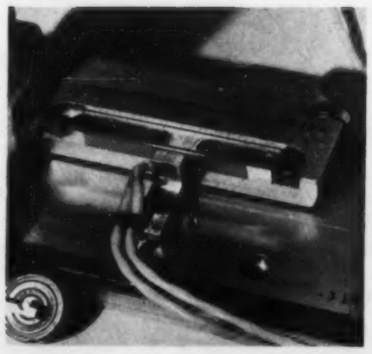
As technology reduces the price of minicomputers, users hope it will be possible to purchase remote scanners that do all the data analysis at the remote station, priced under $20,000.

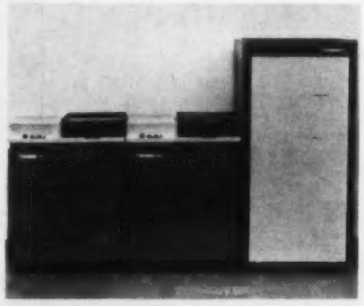
Moving the processing power into the remote station would reduce the transmission problems to the standard error and transmission rates available today. It would also reduce the load on the central processor, further decreasing the system operating cost.

Users need these problems solved now, but recognize that they must wait until the right prices and the right equipment are available. The potential dangers of inadequate equipment and overly expensive systems have been clearly brought home by management information systems and the like over the last three or four years.

All the users surveyed indicated they would prefer to wait an extra year and get the right pieces of gear and the right systems design.



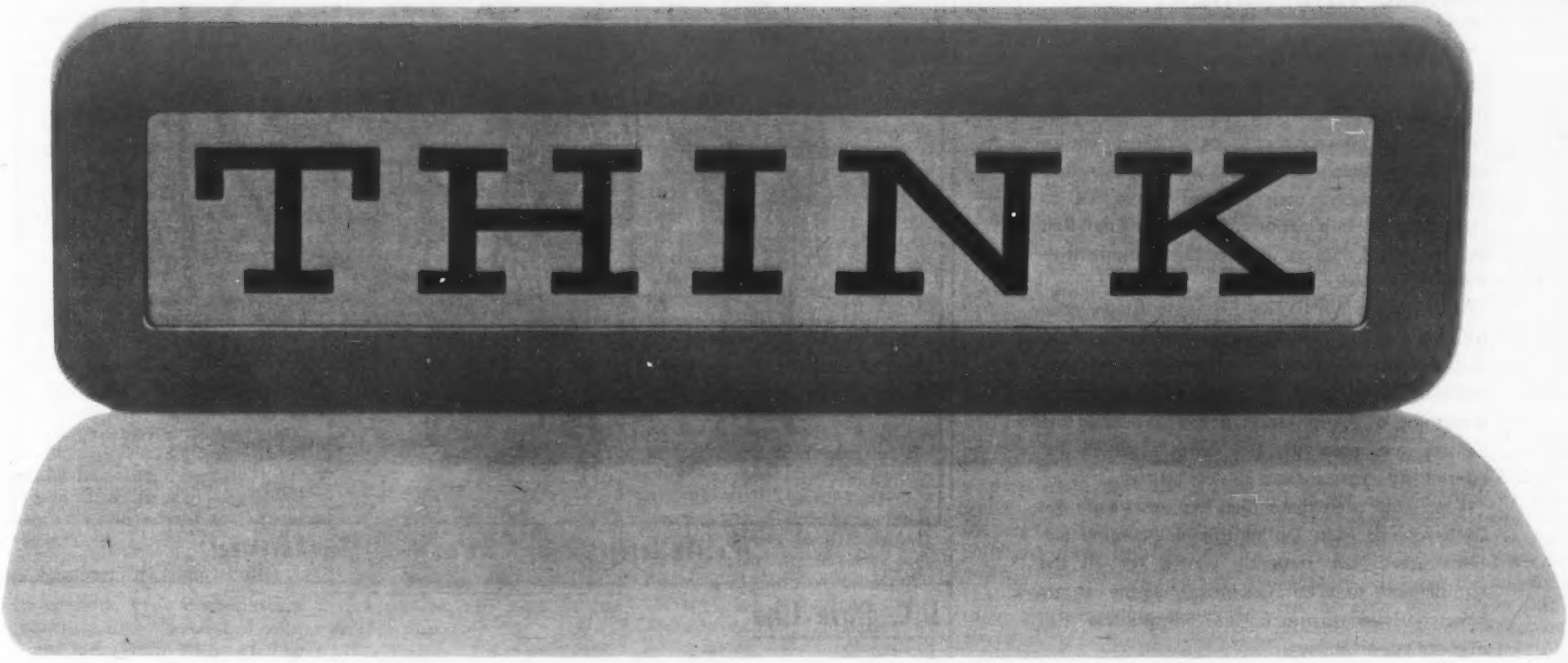




DP Medic Alert

ALABAMA – Within 10 seconds, an Alabama doctor can obtain the medical background of any of the state's 7,000 residents registered with Medic Alert Foundation (MAF).

A computerized central answering file has been installed in the foundation located in Turlock, Calif.


THINK

Editorials

It's Time to Interconnect

The recent report presented to the Federal Communications Commission by a study panel of the National Academy of Sciences stated that uncontrolled interconnection of noncarrier equipment to the telephone network would be harmful. The panel had been commissioned by the FCC to investigate the implications of connecting non-Bell devices such as data communications equipment to the phone network.

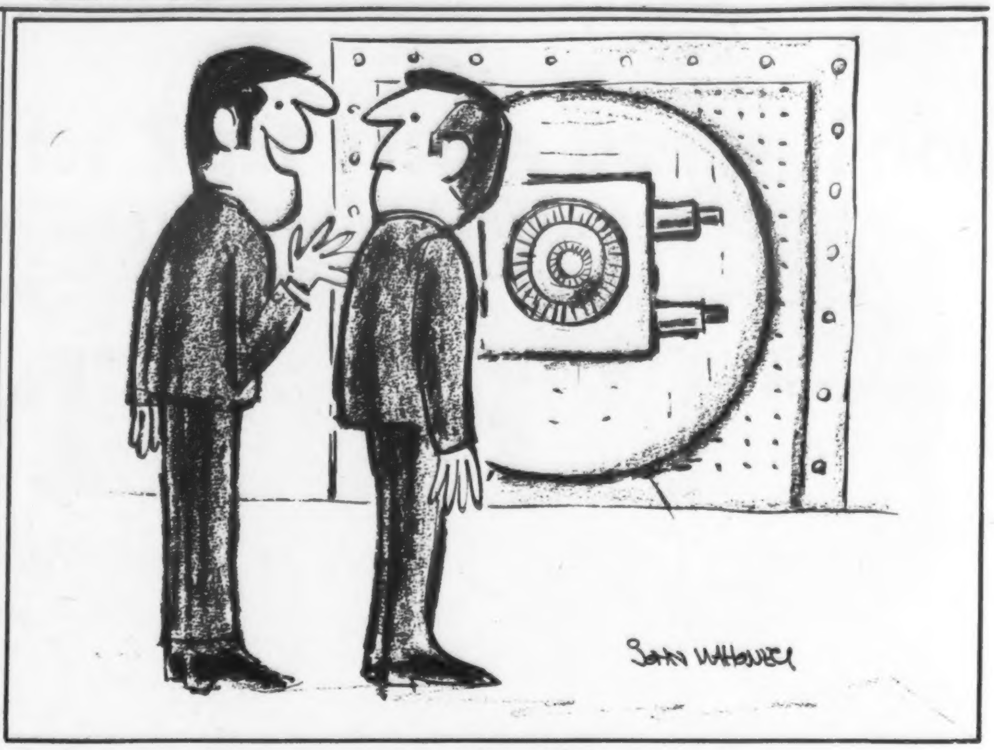
Although the NAS panel has undoubtedly contributed essential technical data to guide the FCC in future interconnection policies and tariffs, the question of harm to the network has become something of a regulatory football providing the carriers, and especially Bell, with a vehicle for continually emphasizing a go-slow attitude.

It has now been more than two years since the Carterfone decision. During this time communications users have patiently waited for all the ramifications to be defined. Meanwhile the carriers have continued to run up the "harmfulness" flag at every opportunity.

Now that the NAS panel has carefully detailed the technical guidelines that should be observed with interconnection, it is time that all parties concerned with the regulatory process encourage the expansion of interconnection.

Users and manufacturers alike unanimously agree that harm to the network should be avoided at all cost. It is now time to let users enjoy the benefits of the less costly and more effective computer data equipment that is already available.

The carriers will now have to emerge from behind their cloak of "harmfulness" and decide whether they can compete effectively in the real world of the data users' market.



'It's the Latest Model - We're Ready for Anything!'

Letters to the Editor

49ers Season Tickets Already Automated

Reference your article on Automating the Steelers [CW, June 24]: As a loyal follower of a losing cause I feel that you have slighted my San Francisco 49ers.

This affront is inexcusable.

Automation of the 49ers' season ticket processing took place over two years ago when they installed IBM equipment.

As soon as they increase season ticket sales 10%, it is my understanding that they will install back-to-back IBM Selectrics.

Jack Olwin
San Francisco, Calif.

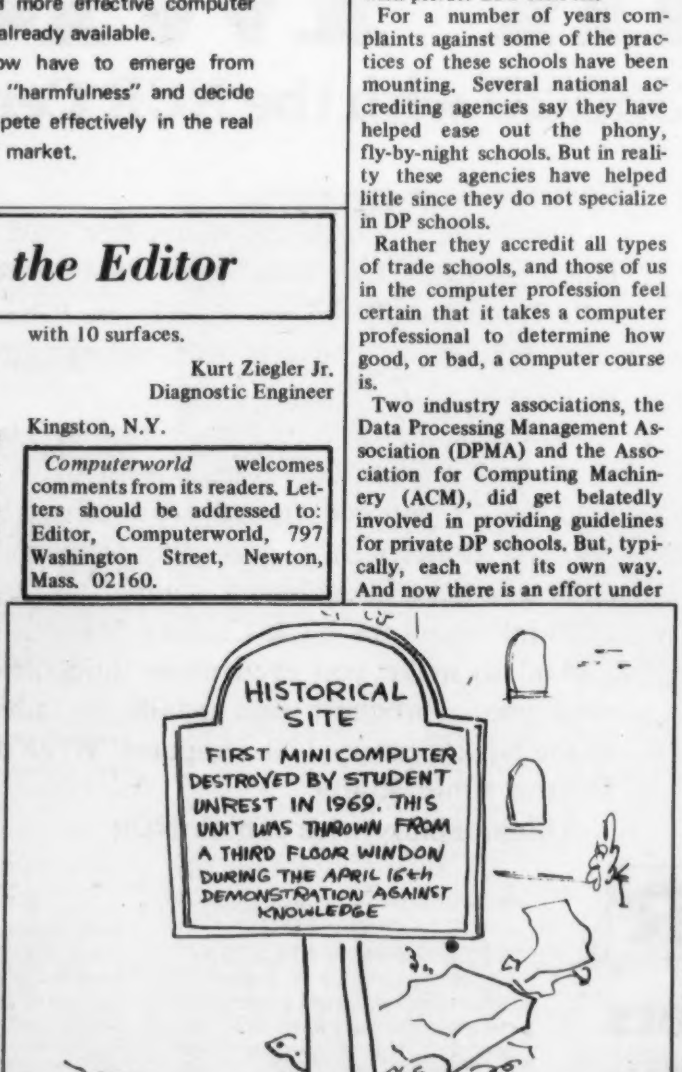
2314 Model A1 Pack Has 20 Surfaces

In the July 8 issue, Page 2 comparison between IBM 2314 Model A1 and IBM 3330, someone must have goofed.

The IBM 2314 Model 1 comes with eight packs each having 20 surfaces with an access time of 75 msec. The IBM 2314 Model A1 comes with one to eight packs each having 20 surfaces with a 60 msec access time. The IBM 2311 consists of one pack with 10 surfaces.

Kurt Ziegler Jr.
Diagnostic Engineer
Kingston, N.Y.

Computerworld welcomes comments from its readers. Letters should be addressed to: Editor, Computerworld, 797 Washington Street, Newton, Mass. 02160.



D.C. Data-Line

Industry Shaken by FTC School Guides

By Alan Drattell
CW Washington Bureau

WASHINGTON, D.C. – Where private industry leaves a gap, historically the federal government steps in. Such is the case with private EDP schools.

For a number of years complaints against some of the practices of these schools have been mounting. Several national accrediting agencies say they have helped ease out the phony, fly-by-night schools. But in reality these agencies have helped little since they do not specialize in DP schools.

Rather they accredit all types of trade schools, and those of us in the computer profession feel certain that it takes a computer professional to determine how good, or bad, a computer course is.

Two industry associations, the Data Processing Management Association (DPMA) and the Association for Computing Machinery (ACM), did get belatedly involved in providing guidelines for private DP schools. But, typically, each went its own way. And now there is an effort under way to combine the guidelines of both organizations to come up with an industry standard.

Alan Drattell

Procrastination

Unfortunately, an ad hoc group with representatives from these two associations, the accrediting agencies, other industry organizations, and the U.S. Office of Education has procrastinated in finalizing a common set of guidelines.

A subcommittee of the ad hoc group working on a common set covering the performance area and consideration of curriculum requirements has completed its work. However, a second unit, working on a common set of rules covering business practices of private schools, has bogged down. A consultant has been called in to help.

Meanwhile, complaints against some private schools continue, setting the stage for the government to enter the scene.

To the surprise of ACM and DPMA, the Federal Trade Commission (FTC) announced proposed guides for private vocational and home study schools. Admittedly, these guides cover other types of schools in addition to those offering data processing curricula.

The FTC guidelines deal only with business practices; they do not cover performance and curricula. An important section of the FTC proposal covers the cancellation and refund policies of schools. Other subjects deal with deceptive trade practices, misrepresentation regarding accreditation, qualifications of instructors, and future employment opportunities.

According to the FTC, the "guides are published not only in the interests of consumer protection, but also with the expectation that the businessman, who is fully informed of the legal pitfalls he may encounter, will voluntarily conduct his affairs so as to avoid them." In other words, the guides are advisory in nature, but by not adhering to them the private EDP school entrepreneur could find himself in a legal hassle.

And, according to John Proffitt, an Office of Education official involved in the FTC guides and with ACM-DPMA on their common set: "We do not see any conflict between the FTC standards and ACM-DPMA. The FTC rules would act as a supportive base for what ACM-DPMA come up with."

Not That Simple

But it is not all that simple. When the FTC guides go into effect – we discount the "if" nature – it will mean once again that the federal government has stepped into an area that private industry, because of indifference, procrastination and bickering, has left open.

Now ACM and DPMA are expected to present their views at a public hearing Sept. 15 at the FTC Building in Washington.

The unfortunate aspect of this entire matter is that it should never have been necessary in the first place for ACM and DPMA to appear at such a hearing. The industry's guidelines – needed for so long – should already have been a *fait accompli.*

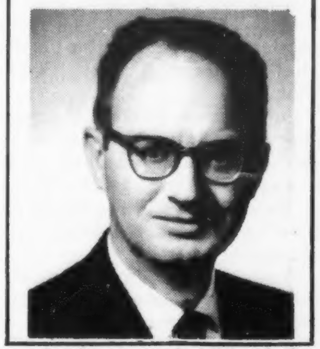
But there is no doubt that the public must be protected against unscrupulous private EDP school operators. As Carl Hammer of ACM's guidelines group said sadly: "I predicted that sooner or later the government would get into this."

The Obvious Answer to Overhead Questions

Yes, Let's Get a Better Cobol Compiler... But Where?

The Taylor Report

By Alan Taylor



One of the most pertinent comments on my recent column on the current size of Cobol overhead was that I totally omitted any suggestions as to what a user could do to save his dollars.

That was a very good comment. I had not mentioned it. And it is the most important area. After all, if there is nothing that can be done, then ignorance is not only bliss, but also wisdom. So let us look at just what can be done.

First and foremost comes the obvious answer – get a better Cobol compiler. One that does not have these overheads. That will solve the whole problem.

It is a nice easy answer. It would answer the problem. But is it really practical? Where would this compiler come from? Would it really help at all? All these questions have to be considered.

Approach the Manufacturer

The first and most obvious gambit is to get a hold of your friendly hardware salesman. Tell him that you want a new compiler. The chances are that he will agree with you that something should be done, take notes and, perhaps, he will write you a letter about the question being referred up to someone for consideration.

The best results that a user can realistically expect from the manufacturer's approach gambit is a delay of two years – one for the manufacturer to agree to the need, and one for the compiler to be developed, tested, and released.

What then is the reasonably expected value that the user can possibly hope to attain? Cobol overhead is expressed in two ways – additional computation time, and additional core storage utilization. The latter is a hardware characteristic, and the user, during the two-year wait, will have to obtain the necessary hardware.

It is unrealistic to expect that core purchased to cover Cobol overhead requirements will be saved – this will be a permanent loss. Performance will hopefully improve – after two years.

As the average life of a configuration is around five years, then two of them is a considerable proportion of the whole. Forty per cent to be precise. By subtracting this amount, the saving from the manufacturer's approach gambit is, at maximum, no hardware, and 60% of the performance.

One additional hazard of this approach is that it can be played the other way. From the moment that PL/1 was announced by IBM in 1964, right through to the apparent surrender of that company to the realities of the situation in 1968/69, approaches to the manufacturer for more Cobol efficiency were very restrained, because of the fear that Cobol would be abandoned – and with it the users' investment in Cobol programs. So, the general situation between user and manufacturer must also be taken into account.

Outside Compiler Vendor

Another possible source for a better Cobol compiler would be a software vendor outside of the manufacturer. This has been attempted on a few occasions – particularly by one of the country's biggest insurance companies, which tried it a few years back. It cost them tens of thousands of dollars, and I believe that they were satisfied that it saved them as much.

But the idea did not catch on. Today you just cannot buy outside Cobol compilers, because the market to support them is simply not there.

Nor has unbundling helped. The cost of a Cobol compiler from IBM, as announced in June, was $55/mo. No outside vendor can compete with this price, or with lease pricing. The only way that it might become possible would be for a group of users to band together, and to commit money for the project.

That really is another gambit – so, regretfully writing off the approach of buying a Cobol compiler on the open market, let us consider the possibility of commissioning one.

Commissioning a Compiler

To commission a compiler requires two basic elements – a supplier competent to produce and maintain a compiler for a reasonable fee, and a group of users who are prepared to pay the fee.

Currently there is no shortage of people who could produce efficient compilers reliably. The shortage is in the other area – people who are willing to put down hard cash – in the terms of $10,000 or so each – for an undelivered product that may be obsolete before it is delivered! (After all, the hardware manufacturer might get hold of the performance specifications and go off and produce a compiler just as good, almost as quickly.)

Alan Taylor, consultant, writer, and former editor of *Computerworld*, is president of Computer Management Aids Corp. of Framingham, Mass.

There are a few user groups which could tackle such a task (Share, Guide, Focus, and now, at least potentially, the Honeywell/GE user groups, which have the necessary numbers), but they are oriented in the other direction.

Life insurance, oil companies, and other industry groupings are also possible, but currently they tend to restrict their hard cash to specific industry problems – such as linear programs, etc. Compilers hardly fit in that category either, so they are also effectively eliminated.

Commissioning, therefore, is yet another approach which shows little chance of making any headway in saving any hardware or time overhead.

So, No Magic Compilers

This means that there is no current good way of obtaining relief from Cobol overhead through the simple solution of getting a better Cobol compiler.

This may sound very discouraging to those who really want to take action. But it is not really a step backward.

By eliminating the easy solution (which really is no more than saying 'Let Jack Do It') from our consideration, we now can concentrate on just what the user himself has to do to save that overhead – without worrying our heads about the possibilities of some nice "Fairy Godmother" putting the answer on our desks as a Christmas present.

Local Group Seeks End To Consulting Contract

By Edward J. Bride
CW Staff Writer

PITTSBURGH—An Allegheny County commissioner and a bipartisan group of citizens have called for the cancellation of a $500,000 computer consulting contract, charging interim reports "say nothing, and they don't even say it well in many places."

MDC Systems, a subsidiary of Management Data Corp., is the subject of the attacks by Commissioner William R. Hunt and the Allegheny County Civic Club.

The criticism involves charges that MDC included savings not in the computer-consulting area in its estimated benefits for John J. Kane Hospital here. The hospital is operated by Allegheny County.

The company is also accused of charging from three to six times what other firms estimated as the value of its services.

How to Improve

MDC Vice-President Thomas Meade stated that, when his company got the contract in 1969, the hospital's management techniques and accounting procedures were not suited to computerization, so "we looked at all avenues of revenue improvement."

Meade countered the charge that MDC's services were expensive by saying he could only "compare this job with the other jobs we've done and this job was priced out the same as our other jobs."

Hunt, also a physician, a former chief, and currently a member of the staff at McKeesport Hospital, has been trying to get the Kane Hospital contract rescinded for about a year.

In a recent statement to the press, Hunt called on other county officials to require MDC to list all unfinished work, then cancel the contract under a 30-day clause and let out the remaining work for bids.

An official of the civic club told Meade: "No private purchaser would spend over $75,000 to get what you sold to the county for $448,000."

Hunt, however, indicated that another firm estimated the value of the contract at $127,000.

Purpose of the Contract

Part of the controversy apparently stems from a difference of opinion on the purpose of MDC's consulting.

In its first quarterly report, in April of 1969, MDC refers to "professional computer consulting services to implement an operational hospital information system" at Kane.

MDC critics now say that the company has expanded its area of concern to general management problems, many of which should have, and may have been considered by Kane Hospital in the past.

George Shankey, vice-president of the civic club, said that the original intent of the contract was "to computerize Kane Hospital," and save $28 million in the process, over a 10-year period.

Shankey estimated that, even with internal management improvements, which he insists are not part of MDC's area of concern, the savings may amount to only $3.5 million.

Savings . . . If

Meade declined to make a current estimate of dollar savings, claiming: "We weren't brought in on the basis of saving money."

He stated that the county "could possibly reach the magnitude" of earlier estimates if many other conditions fell into line.

Shankey is not happy with the current situation. He reported that legislation was introduced on June 30 to require future consulting contracts to be let out for bids. The civic club has questioned 88% of MDC's projected savings, but there appears to be little else it can do to bring about contract cancellation.

He noted that the other two county commissioners are Democrats, and both were involved in letting the MDC contract. Hunt was not in office when the contract became effective 18 months ago, and he is a Republican.

70/7522 Terminal Fully Compatible With RCA Line

CHERRY HILL, N.J. – A replacement unit for the RCA 70/752 Video Data Terminal, incorporating some features of the 70/751 Modular Data System, can increase terminal flexibility for the user, according to the firm.

The RCA 70/7522 Video Data Terminal (VDT) is fully compatible with all RCA computers, J.W. Rooney, an RCA division vice-president, said. In addition, it can be interfaced with the IBM's 360 and 370 series, Rooney added.

One of its unique features, according to Rooney, is a selective display capability, which allows both the display and printing of confidential information while entering data into a data bank.

A 1-to-15-character suppressed field can appear on the screen, if desired. When the operator uses the feature, the field to be entered is filled with special characters composed of vertical bars. As the data is entered, the bars remain unchanged, resulting in the desired security.

Confidential Files

Suggested applications for this feature include the entering of access codes to confidential files and medical and financial applications which can include sensitive information.

On-site maintenance is said to be simplified, Rooney said, by a rear-panel, plug-in control board, which allows special features to be interchanged with a spare unit.

Maintenance can be performed on the 70/7522 at remote sites using a built-in loop test without requiring central processor time. Also, a CPU can test communication lines and devices with an automatic retransmit feature.

Combined Features

Rooney noted that the terminal combined a number of other features all of which currently are not available in any one terminal on the market today. These features include:

- A double-page capability providing two 1,080- or 1,134-character displays, which can be alternated on the screen at the touch of a key. Both pages can be combined into one message to reduce transmission time.
- Processor-controlled screen erase and cursor positioning that permits variable data to be erased, and the cursor to be relocated for each transaction automatically without manual operator intervention.
- Three modes of hard copy printout controlled by the operator, the processor, or automatically under unattended operation. This is possible only when the display is attached to a central processor through a private communications line, the company said. Printout occurs from a screen-size separate buffer, freeing the display and keyboard for other operations. Any serial printer with a capacity of up to 120 char/sec can be used.
- Line and character addressing from the processor.
- Transmission speeds, in either synchronous or asynchronous modes, ranging from 300 to 2,400 bit/sec.
- The 70/7522s can be used on a multidrop full-duplex line and operated on the same line with RCA's older Modular Video Data System.
- Seven cursor movement controls for forward, backspace, start of previous line, start of next line, end of previous line, index up, and index down.

Other features of the 70/7522 include editing and manual erase controls, a picture screen using a monoscope for character generation, data format call-up with tab and skip keys, processor override mode, variable start of transmission, and split screen operation.

Monoscope Tube

While the monscope tube is credited by RCA with clearer and sharper images, it eliminates the possibility of using the terminal to display curves and graphs.

The 70/7522 is equipped with a 12-in. rectangular screen and is available in capacities of 1,080, 1,134, 1,620, and 1,782 characters. The full Ascii set of 96 characters, both upper and lower case can be displayed. It is a self-contained unit which houses the video screen, keyboard, controls, and power supply.

The terminal runs under RCA's communications operating system under TDOS on the Spectra series. It can also connect through a 2701 to an IBM 360 or 370. RCA said that a software package will be provided to enable the terminal to be used alone or under Btam on the IBM systems.

According to RCA, first deliveries are scheduled for Nov. 1, 1970. The base price of the 70/7522 will be $190/mo including maintenance equal to the 70/752. Purchase price will be $8,320, with a maintenance charge of $35/mo.

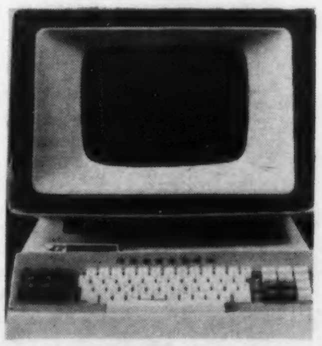
RCA also said that the price of the older 70/752 will be reduced 25% on Nov. 1 and will remain in the product line on an "as available" basis.

CRT Terminal Contains Stored Program Computer

By Christine Frederickson
CW Staff Writer

MARLBOROUGH, Mass. – A CRT terminal, called the SPD 10/20, that contains a stored program computer is available in single- and dual-display configurations from Incoterm Corp.

The single screen model has a 30-line capacity with 64 char/line. The dual display model can display up to 15, 64-character lines on each screen.



Incoterm SPD 10/20

The terminal features a magnetic core memory of up to 2,048 16-bit words with a 1.6µsec cycle time. The self-contained computer allows the characteristics of the terminal to be defined through software or programming, according to the company.

Applications

The presentation that the operator sees – as well as the events that occur when she types or presses special keys – may be changed or optimized for particular applications. There can also be differences between what an operator sees and the form or content of data sent to the central computer.

The terminal can operate under the communications set-up of any network or mainframe computer, the company stated. The terminal features a binary-parallel, byte-oriented processor operating with 16- or 32-bit instruction words. It can add, subtract, compare, branch, and jump at 3.2 µsec, the company said.

58 Instructions

Addressable registers include accumulator, line and character. The computer has a repertoire of 58 instructions. The SPD 10/20 can be used in a processor mode so that normal display functions are suppressed to allow the unit to act as a processor only, performing such functions as line management, station polling, and communications supervision.

Special or unique user function keys can be designed into individual terminal keyboards at no additional cost, the company said. Other special features include an optional remote loading mode, a point-graphics mode and a core-saving feature called auto-exec.

The SPD 10/20 terminal is priced at $9,000. For 400 units, the price is $4,100 each.

The dual display model (one computer with two displays and keyboards) is priced at $6,090.

The dual displays are $5,440 each. Delivery is about 60 days.

Incoterm Corp. is at Hayes Memorial Drive.

Sycor Terminal Analysis - Part III

Peripheral Interfaces Varied for User

By Malcolm L. Stiefel
Special to Computerworld

Peripherals which interface with the Sycor terminal include a printer, a computer-compatible tape recorder, a card reader, and a combination computer-compatible, tape-recorder cassette-communications station. In proper combination with one or more terminals, they provide the user with a complete remote batch entry system at several choices of levels of automation.

The printer, manufactured by Univac, prints one character at a time under control of the terminal, in 132-character lines at 30 char/sec (300 word/min).

Sycor supplies horizontal line formatting logic with the printer; vertical formatting is an additional option, which permits different lines to be printed in different formats. The printer operation can be executed in parallel with other input-output operations from the terminal.

One of the most interesting and powerful peripherals is the computer-compatible tape recorder, built for Sycor by Ampex. This unit can accept data from a cassette and record it on a standard reel of IBM-compatible, 7-track 556/800 bit/in. or 9-track, 800 bit/in. magnetic tape. These recorders, termed "data converters" by Sycor, may be ordered with outputs compatible with computers of several other major makers, like Honeywell, RCA, Univac, Burroughs, Control Data, and NCR. The terminal that interfaces with a data converter, however, cannot have a communications option attached. This will be discussed later.

The data converter is rated at 12-in./sec read/write speed. Therefore, it is slowed down by the cassette outputs when it is working with the terminal. The converter can record an 80-character message from a buffer in less than .1 sec, but the cassette will take .5 sec to load the buffer.

The so-called communications converter station includes a 1,200-baud, half-duplex I/O capability for the data converter set, tied to a modified microprocessor with control switches but no keyboard. This converter can be tied to a communications line for accepting remote inputs.

An optional cassette may be incorporated into the communications converter so that a separate interfacing terminal isn't needed for local data conversion to computer-compatible format.

The card reader can read the contents of 80-column cards into the cassette when it is hardwired to a terminal. However, this is a one-way device. Sycor says that it will develop a card punch in the future, but it has none now.

Viatron's difficulties in delivery of System 21 and its switch to a purchase-only policy have prompted a search for suitable alternatives. In this series, CW examines the Sycor terminal, which comes closest to System 21 in features and also offers users the added capability of interfacing with major manufacturers' computers.

Sycor says that its equipment is designed to be used as a remote batch entry system. This contention is borne out by looking at the possible configurations that can be devised using the basic terminal, the add-ons, and the peripherals.

Basic Terminal

The basic terminal with two cassettes costs $7,400 and leases for $200/mo, including maintenance. (All lease prices mentioned below include maintenance). If the accumulator and check digit capabilities were added, the system could be used alone as a customer billing system, which could store active account data on cassettes, and accumulate balances for each customer by using the accumulator in the calculations.

This system would cost $8,800 (or $252/mo); it would not provide any automatic means for producing billing statements. That capability could only be derived if the printer is procured, bringing the total system cost to $12,300 (or $372/mo).

In short, the use of the terminal as a stand-alone, slow-speed data processing system would be prohibitively expensive.

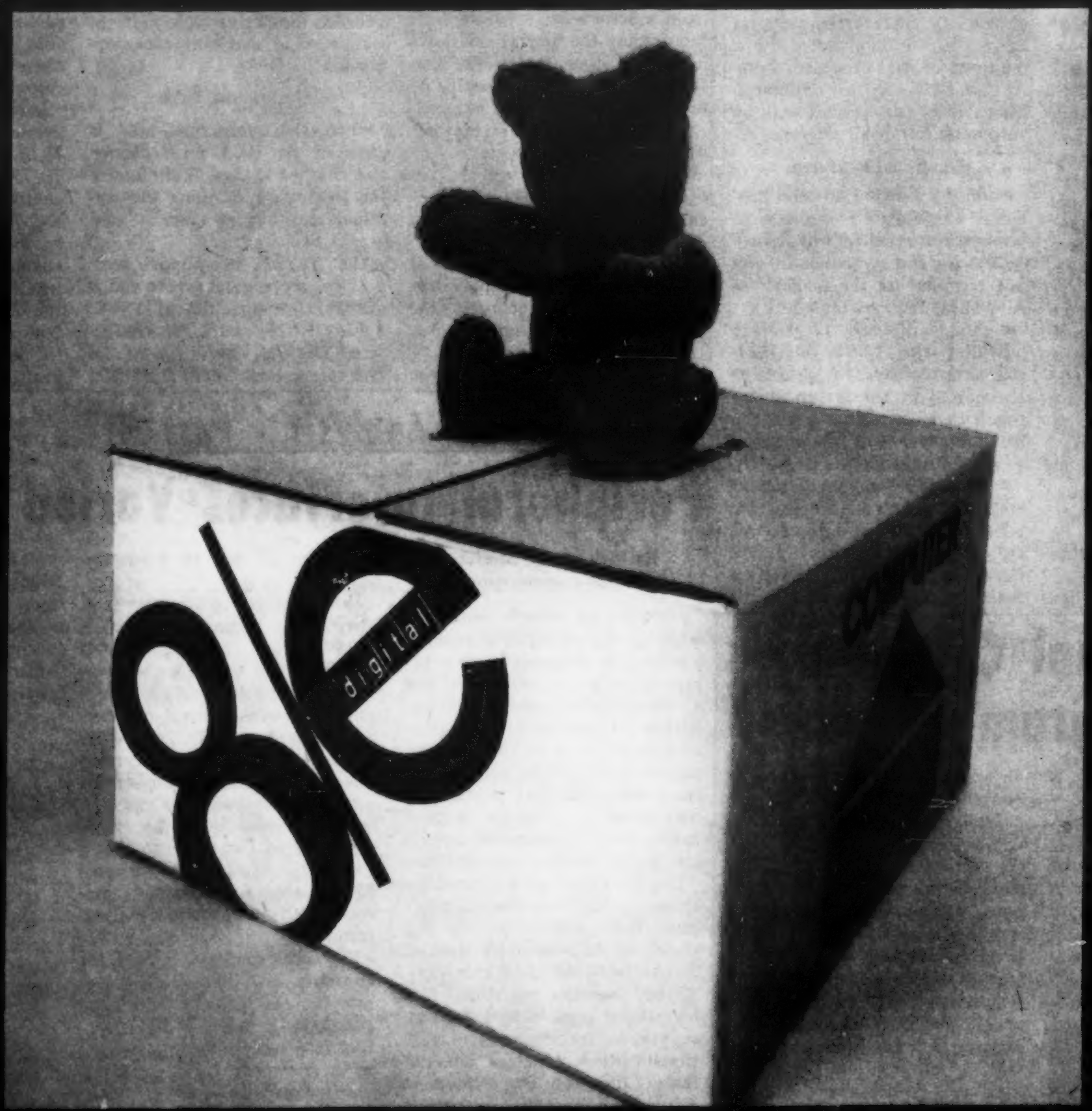
By the same token, it is tempting to think of the terminal as a potential automatic typewriter in this configuration, but it is far more expensive than IBM's, or Friden's or Dura's gear – and it doesn't have full text editing capability.

The use of the Sycor terminal as a key-to-tape keypunch replacement system should also be laid to rest quickly. Not only is the terminal more expensive than a keypunch (even the one-cassette version), but users say that its verification procedure is slow.

The users have reported that verification is fine until an erroneous record is encountered. Then the operator must go through a relatively cumbersome and time-consuming process to make corrections to records on the cassettes.

One user showed that the Sycor gear was a little faster than the keypunch in generating the record in the first place, but that the verification process was very much slower on the Sycor unit.

Malcolm L. Stiefel is an independent consultant in the area of systems design. He has had extensive computer peripheral experience.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digital
COMPUTER

Manufacturing Efficiency Lowers Hardware Prices

Increased efficiency on manufacturing techniques and production economies has allowed several hardware manufacturers to decrease their product's price as much as 40%.

* * *

Information Displays, Inc. (IDI), Mount Kisco, N.Y., has lowered the price of its Idiiom computer-driven interactive display system by approximately 25%, from $81,200 to $59,500.

The Idiiom system incorporates a small computer that enables it to be used in a free-standing mode as well as in conjunction with a large computer system.

The reduction was made possible by significant reductions in component costs and increased automation in production processes, according to Carl Machover, IDI vice-president.

* * *

Bunker-Ramo Corp., Stamford, Conn., reduced lease prices by about 20% and purchase prices about 30% on series 2200R CRT terminal equipment contracted for delivery after May 15.

Customer response, new logic, and manufacturing techniques were the reasons given for the reduction in prices. However, an increase in some unit monthly maintenance prices was also announced.

As an example of the reductions, the purchase price of the Model 2222 control unit multistation was reduced from $11,295 to $7,965.

* * *

Honeywell, Inc., Computer Control Division, has lowered H316 minicomputer prices from $9,700 to $8,400 for the 4,069-word model. Corresponding reductions were also made on models with 8,000 words and above.

The base price for small mass storage drum units has increased from $8,900 to $11,000. However, maintenance prices on all computer lines have been increased an average of 6%, the company stated.

Prices of peripheral equipment and special-purpose models of the Series 16 minicomputer are not affected.

* * *

Madatron Corp., Princeton, N.J., has reduced the price of its Alpha-Numeric Display System by over 40% as the result of technical improvements and production economies, the firm said.

The price of the DS-12 Alpha-Numeric System, which has a 12-position display module with a 64-character capacity, is now $495.

* * *

ComData Corp., Niles, Ill., has redesigned its Series 100 frequency division multiplexers and reduced the cost 40%.

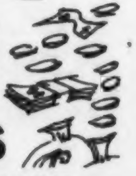
Now called the Series 200, the multiplexers feature equal opportunity access for multiple drop channels and the elimination of high-speed modems.

The price reduction was made possible by in-house manufacture of all components, a company spokesman said.

Prices now start at $1,440 for the first channel plus $610 for each additional channel. Prices were $2,574 and $1,089, respectively. Delivery is from stock.

* * *

Datum, Inc., Anaheim, Calif., has reduced the price of its magnetic tape I/O systems for minicomputers by approximately $400 to $500. The systems are designated the Model 5091 Tape Systems, and a complete system consists of a controller, single tape transport, interconnecting cables and compatible software. Delivery is 30 days.



Pull the Trigger and OCR 'Gun' Reads Data

By Christine Frederickson

CW Staff Writer

WILLOW GROVE, Pa. – What looks like a Buck Rogers gun is actually an OCR reader for applications such as inventory control and supermarket checkout.

The OCR gun, made by Transducer Systems, Inc. (TSI), is being used in a system offered by Inventory Management Systems, Inc. (IMS), Los Angeles. IMS calls the device, when used in its system, the Tru-V reader.

The OCR gun includes a digitizer and interface to a computer. The gun operates when it is directed to a code number on an item, and the trigger is pressed. The device then transmits the numerical code to a computer.

The computer, interfaced with the gun, translates the information received into a price. A terminal receives the price and rings it up. The items or products to be processed in this manner must be labelled with a special OCR-detectable number. The gun can read up to 11 digits.

TSI is selling the OCR gun and digitizer at under $10,000, plus the cost of the computer interface. The gun is available on a two- to three-month delivery from TSI.

Transducer Systems, Inc. is at Easton and Wyandotte.

Transducer System's OCR Gun

Disk Unit Added to 520/i

IRVINE, Calif. – Varian Data Machines has added a low-cost disk storage unit to the line of peripheral equipment available for use with the Varian 520/i computer.

The Varian 520/i has been widely used as a communications controller and computer preprocessor, according to Varian. The disk drive expands this capability by providing mass storage for data being processed by the computer system.

The disk drive is a fixed-head-per-track unit which permits rapid accessing of stored data. The controller supplied with the disk provides complete information-and-control interface between the 520/i computer and the peripheral device, Varian said. The complete option includes the disk drive, a plug-in controller card, and interconnecting cabling.

Said to be ideally suited for applications requiring fast access and high data transfer rates, the new disk offers storage capacities ranging from 38,000 to 576,000 bytes. The number of data tracks can range from 8 to 120, with a separate read/write head for each track. This fixed-head-per-track arrangement permits an average access time of only 17 milliseconds for transfers at 146,000 characters per second, Varian said.

The disk unit can be delivered 90 days after receipt of order. Prices for these units, depending on storage capacity, range from $6,500 to $13,000.

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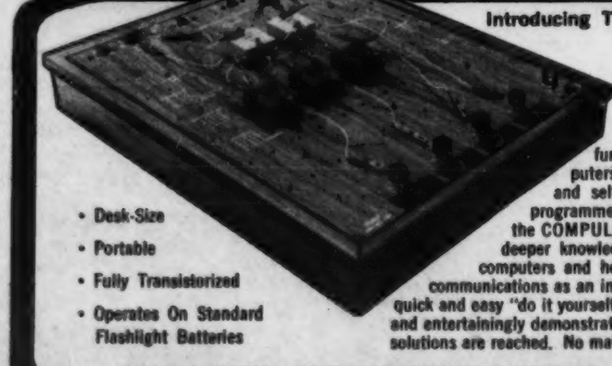

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Packages Debug Nova Software on PDP-10, 360

BUFFALO, N.Y. – Users can develop and debug software for the Data General Nova minicomputer on either the DEC PDP-10 or the 360, by using the Novasm and Nomac packages from Comptek Research Inc.

Installations at which Novas are already crowded with production work, or sites where the minicomputers are still on-order would find these programs particularly useful, the developer said.

The Novasm program is a simulator package that allows all the support software developed for the Nova, including the Assembler, Algol, Fortran, and floating point packages, to operate on the host machine. Applications programs previously developed on the minicomputer will also operate on the large-scale host machine with Novasm, Comptek said.

Nomac is an assembler that includes a number of extensions, in addition to duplicating the capabilities of the standard Nova assembler. Macroinstruction generation, generalized nested arithmetic expressions, and conditional assembly instructions are said to be among the new features.

Object Files Compatible

Object files produced by the Nomac assembler are fully compatible with both existing Nova software and the Novasm simulator, according to Comptek.

The Novasm package has two modes of operation. In the command mode, the user controls the functions that are to be performed by the package, such as loading programs, examining registers, and inserting debugging instructions. In the simulation mode, the Novasm program executes designated binary programs.

The Nova simulator uses an appropriately sized subset of the PDP-10 or 360 memory to represent the memory of the Nova. Novasm executes a program by interpreting all of the Nova instruction fields in a manner similar to that of the control logic of the Nova itself.

The simulator is said to permit single-pass assemblies of Nova programs while using the standard Nova Assembler, since intermediate storage is provided by the larger machine. The assembly results in either the punching of a paper tape or in the writing of a binary file on disk, tape, or cards (at the user's option).

Faster Run Times

In addition to faster assemblies, Novasm provides faster program run times than are possible on the Nova itself. The simulator is able to do this by utilizing the more extensive software capabilities of the larger machine, Comptek explained.

Both Novasm and Nomac can be run under either DOS or OS on the 360, with Nova device names being related to 360 devices during the JCL phase.

Input for the Nomac assembler, when used on a PDP-10, may be on any valid input device except teletypewriter, according to Comptek, and output may be on any valid PDP-10 output device, without restriction.

Novasm and Nomac are available on a PDP-10 time-sharing basis through Comptek, as well as on a one-time lease for inhouse use.

For time-sharing users, there is a $50 initiation fee and $25 minimum monthly billing charge, irrespective of the number of user terminals. Prices for the use of the Novasm package are $12.50/hr for connect-time and $10/sec per 8K memory segment for CPU time. There are separate charges for the various peripherals.

For the PDP-10 in-house installation, the two programs are available for a single time lease of $5,000, which includes a one year warranty, full documentation, and installation at the customer site. The programs can be leased separately, at $2,500 for Novasm and $2,000 for Nomac, but in each case the customer is responsible for installation.

A 360 user can lease the two programs for $2,000, or Nomac by itself for $1,500. In either case, Comptek provides documentation and a one year warranty but, as with the PDP-10 packages, the user is responsible for installation if he selects the single program.

Comptek Research Inc. is at 4548 Main St.

'EZFlow' Assists Fortran Programmers

ANAHEIM, Calif. – Programmers working in Fortran can have much of the developmental "housekeeping" done with the EZFlow program from Systonetics Inc.

According to the developer, EZFlow is "not simply another flowcharting program." Although it can generate a logic flowchart, Systonetics said that it can also reformat all statements consistently, renumber the statements sequentially, print a cross-reference list and/or produce a new source deck of the original program in the improved form, all at the user's option.

Other control cards are said to allow the flagging of common programming errors, and the conversion of certain Fortran II statements to Fortran IV format. Another feature permits the conversion of BCD to Ebcdic character sets for those computer systems that use the extended code.

Default Option

While the user can utilize control cards to call for specific features on a program-by-program basis, the developer said that a "complete default" option is also available, under which the same features of EZFlow are applied for all programs and individual control cards are eliminated.

Systonetics also pointed out, however, that the "complete default" option can be overridden and control cards inserted for particular programs when special features are desired.

The feature that seems to tie EZFlow together is the cross-reference table, which relates statement labels and references of the original to the labels and references in the restored, resequenced program version.

Written in Fortran IV, EZFlow has been implemented on both the 360 and the CDC 6600. On the IBM equipment, the program operates under OS and utilizes at least 110K bytes of storage. It uses 32K words and operates under the Scope monitor with the Control Data CPU.

Because it is written in Fortran IV, the program can easily be adapted to function on other machines, the company said. The current version of EZFlow requires a line printer, but versions geared to plotter and COM output are under development, a spokesman said.

The price of EZFlow is $1,750. This includes an EZFlow source tape (or card deck), a user's guide and installation instructions.

Systonetics Inc. is at 600 N. Euclid St.

Adapt-A-Dial System Guarantees Random Phone Number Sampling

PHILADELPHIA – A telephone sample compilation technique that guarantees absolute random selectivity and projectable market representation has been developed by Adapt, Inc., for 360/25 and 360/65 users.

Based on a computerized random number generating formula, the new system, called Adapt-A-Dial, is keyed to central telephone offices throughout the U.S.

The system provides a perpetual series of exchange-integer combinations, using random numbers keyed to sample parameters (size and location).

Samples can be structured to represent practically any sample configuration – standard metropolitan statistical area; state region; county, central office; or exchange, stated the company.

According to Adapt, the system eliminates sampling errors resulting from omissions in current directory listings. In addition, Adapt-A-Dial eliminates the human error related to manual sample compilation and the labor connected with initiating and maintaining valid sample cells.

The cost for pure computer processing is $100 for the first 1,000 random numbers and $10 for each additional 1,000 numbers.

The company is at 624 S. 62nd St.

Memories Extended via Disk Package

NEW YORK – System/360 users having extra storage available on an IBM 2311 or 2314 disk pack can use these devices as a virtual extension of core memory, with the X-Tend package from PDA Systems Inc.

In this way, the company said, the user who requires extra storage for a few programs a month can have it, without paying for additional core that is unused most of the time.

There is no limit to the amount of the disk pack storage that can be used with X-Tend. According to PDA, an entire pack could be set up as a core extension, if the user chose to do so.

However, the relatively slow access time of the disk would have to be compared to the speed of internal storage by any user, a PDA spokesman admitted.

95% Transparent

The current version of X-Tend operates under either OS or DOS, on any size 360, and is "about 95% transparent" to the user.

Problem programs are written without regard to the X-Tend logic. A control card is needed, however, to link the X-Tend module to the user program, and to define the disk pack Extents that are available for the "core stretching" operation. PDA said that a fully transparent version, with no control card required, is being developed.

The X-Tend module logic calculates the actual space required by the problem program, then controls the loading of the program into the virtual memory on the disk pack.

Cost of the X-Tend package is $2,400 for the first CPU and $500 for each additional CPU. It includes implementation and interfacing by PDA Systems.

The package is also available, for a minimum two-year lease period, at $120/mo for the first CPU and $25/mo for each additional unit.

PDA said that it would take care of any program bugs that occur in X-Tend without cost, but that charges could be levied for revisions to the package.

PDA Systems Inc. is at 12 East 86th St.

Spectra 70s Get Ocrca Data Base

CHERRY HILL, N.J. – Medium-scale, communications-oriented Spectra 70 installations will be able to use the Ocrca data base management system for both real-time and batch multiprogramming environments, according to RCA.

Developed jointly by Orange County, Calif., and RCA, the system is said to give users new methods of integrating, accessing, and maintaining dynamic data bases. A centralized library facility within Ocrca reduces the need for program change each time data sets or formats are revised, RCA said.

Three basic subsystems within Ocrca provide data base management, generalized processing facilities, and communications capabilities. Said to stress responsiveness and ease of maintenance, the data base management subsystem is designed to support standard RCA random access devices.

RCA said that the generalized processing subsystem can incorporate programs written in Assembly or higher level languages including Cobol.

The Ocrca system operates with RCA's Tape-Disk Operating System on Spectra 70 models 45, 55, and 60 with at least 131K bytes of storage. The data base management subsystem can use the 70/564 disk storage unit, the 70/568 mass storage unit and the 70/590 direct access storage system, according to RCA.

The company said that the package is to be supplied without extra charge in the standard systems services supplied to both bundled and unbundled Spectra 70 users. The system will be made available as an RCA Type II software product in September, a spokesman said.

360 Cobol Adds Bit Manipulation

GREENWICH, Conn. – Users of 360 Cobol can add bit-manipulation capability to their programs by using B2BCONV, an Assembler language support subroutine, marketed by TriValent Enterprises, Ltd.

The ability to control individual bits within a byte means, for example, that the presence or absence of up to eight conditions can be shown in a single byte. According to TriValent, this could lead to the reduction of storage requirements for a data base, and a corresponding reduction in I/O time.

B2BCONV operates under either DOS or OS/360, and follows IBM linkage conventions. The basic package is serially reusable but a re-entrant version has been developed for real-time applications, according to TriValent.

The subroutine is available on lease, for a one-time fee of $595.

Trivalent Enterprises Ltd. can be reached through P.O. Box 654.

Zip Code Service Finds Marketing Product Prospects

NEW YORK – Marketing managers operating on a national scale can match prospects to products, spot uncovered territories, or plot transportation routings with a Zip Code locator service available through Listfax Computer Services, Inc.

Because the service includes Census Bureau-based demographic data by Zip Code, it can also be used to improve franchise programs, measure sales potential vs. performance, or perform any other task requiring the exact measurement of distances between zips and the selection of optimal locations. The demographic data is constantly being updated, Listfax said.

The company explained that, in developing the service, the geographic coordinates of approximately 40,000 zip codes were built into a computer-search system. The program is able to calculate the distances between post offices, with the coordinates.

This ability to calculate distances, combined with the demographic data available by Zip, means that a user can request almost any pattern of information he wants, according to Listfax.

The user could ask for all the zip codes within 100 miles of New Orleans; or all zips, nation-wide, with median income greater than $10,000; or all zips in California that have had a population growth of more than 75% in the past 10 years, Listfax said.

Software

A Listfax spokesman added that requested listings can usually be provided over-night, once the exact goal of the search has been defined.

Cost of the service depends on the complexity of the search, and the number of items listed. Listfax said that for a 10,000 item list based on simple parameters, the charge would be approximately $600.

Listfax Computer Services is at 30 East 60th St.

Program Series Aids Managers With Forecasting via T/S Net

BOSTON – Company managers can get assistance in forecasting, planning, and decision-making by using a series of programs available from Applied Decision Systems (ADS). The programs are available on a time-sharing basis through the Com-Share network.

ADS describes Infact as a "generalized" program that allows retrieval and manipulation of information from various types of data bases such as report generator applications.

Another program, Adfit, is said to provide management with a tool for handling forecasting problems associated with time series analysis of data. It permits the study of relationships between two sets of data for predictive purposes.

Where risk and venture analysis is required, ADS said that the Adsim program may be used to simulate future situations.

Through the use of the Adfin program for financial analysis, the user can see the financial effects of various possible plans on his company.

A program designed to evaluate the impact of alternate courses of action is Adtree. According to ADS, this program uses decision tree analysis for problem solving.

To assist in managerial decision making is also the function of Adlin, an interactive generalized linear program, which has been designed to solve standard LP problems.

There is no initiation fee for use of the Com-Share network, and no monthly minimum billing. CPU time is billed at $.03/sec and connect time costs $14/hr. Mass storage of data is also available for $.60/1K char/mo.

The programs are also available for sale to individual users, but ADS said that no firm price has been established yet. The programs are written in Fortran and have been implemented on the XDS 940 and the CDC 3300. A version for the 360 is now in development, the company said.

Applied Decision Systems, Inc. is at 1300 Soldiers Field Road.

Package Gives Teller Name, Address Data On Real-Time Basis

ST. LOUIS, Mo. – Savings bank tellers can have name and address information on a real-time basis, by using a program module that has been added to the St. Louis On-Line Financial Package by Financial Data Systems (FDS).

Other modules already in use include savings and mortgages, certificates of deposit, general ledger, construction and home improvement loans, and investor reporting in addition to those geared to provide I/O support for particular terminals.

The name/address feature gives the teller full access to a file for opening new accounts, preparing passbooks and signature cards, and verifying changes, FDS said. The data will be available for on-line inquiry, correction, addition, and deletion.

FDS sees the new capability as the first step towards a centralized name/address file for all applications within a bank. A spokesman noted that if name/address data could be centralized, it could be dropped from the separate application files and the time required to process these shortened files would be reduced.

Written in BAL, the name/address module has been implemented on a 360/30 using 64K storage under DOS. An OS/360 is presently being developed, according to FDS.

The module costs $5,000. The basic St. Louis On-Line Financial Package, which includes the Savings and Mortgages, Christmas Club and I/O support module, costs $25,000.

Financial Data Systems is at 6680 Chippewa.

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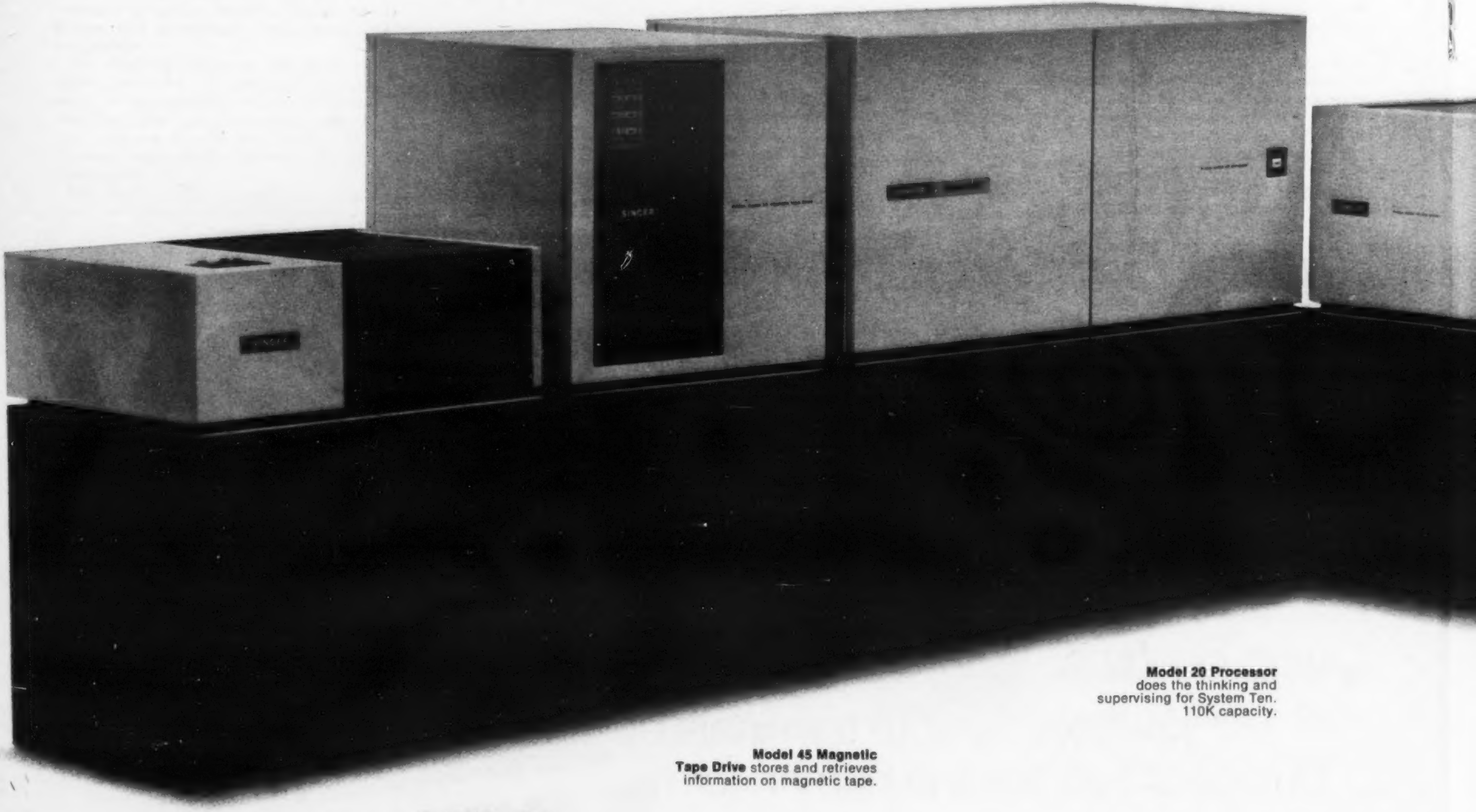

Model 20 Processor does the thinking and supervising for System Ten. 110K capacity.

Model 45 Magnetic Tape Drive stores and retrieves information on magnetic tape.

Model 40 Disc Drive stores masses of data for use at any time.

Model 70 Workstations like these can be placed anywhere in your plant or office for instant access to System Ten

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1. System Ten can process up to 20 jobs simultaneously. Including batch processing.

2. System Ten allows you to distribute workstations anywhere you need them in your office or plant. Terminals like the three shown here can be added simply by connecting two wires.

3. System Ten operates from a common data bank—with up to 100 million characters of storage—accessible to multiple terminal locations.

4. System Ten time-shares without a costly executive software operating system. Instead, it uses hardware.

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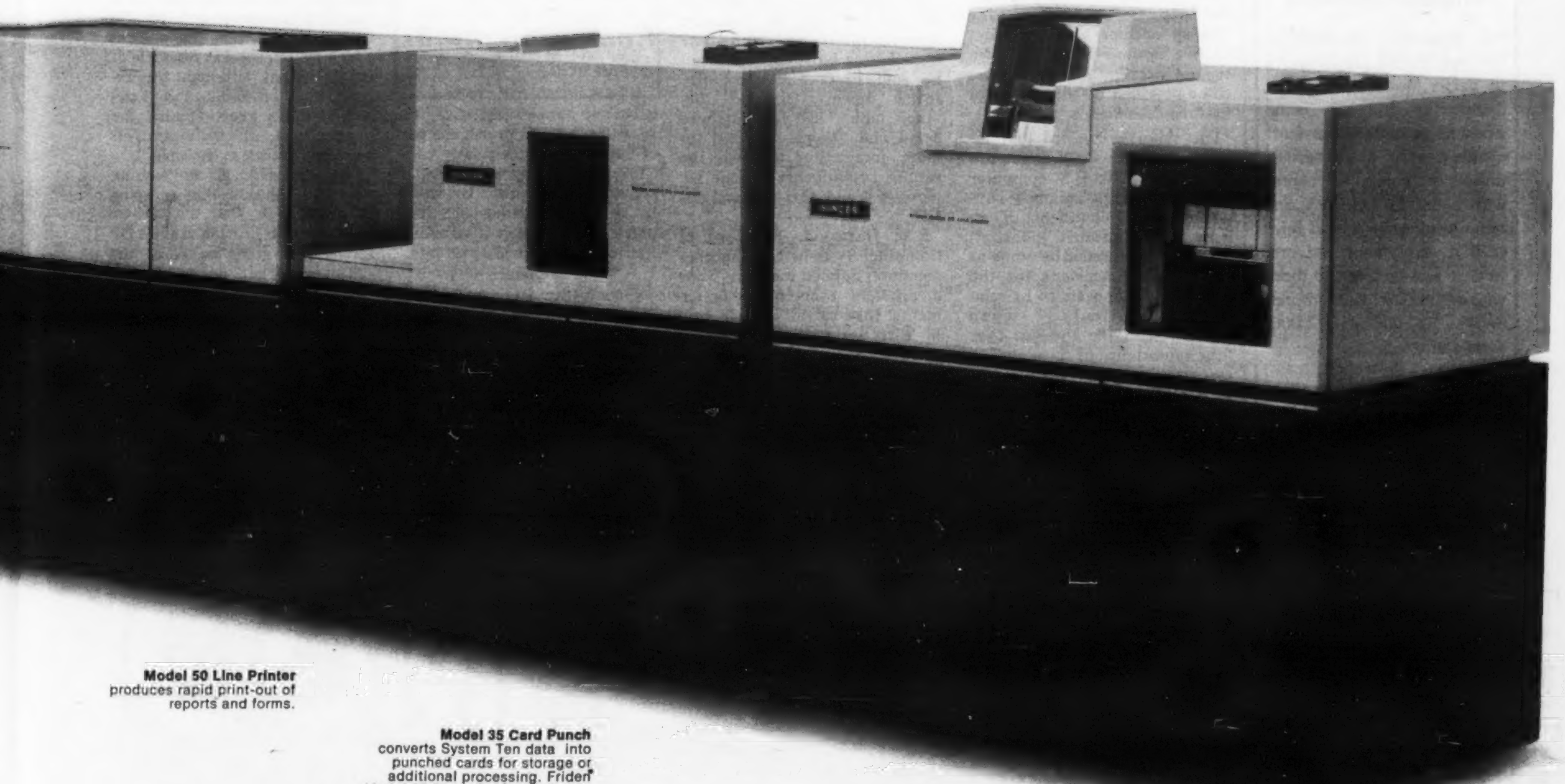

Model 50 Line Printer produces rapid print-out of reports and forms.

Model 35 Card Punch converts System Ten data into punched cards for storage or additional processing. Friden® Model 65 Paper Tape Punch also available.

Model 30 Card Reader reads and transfers information from punched cards into System Ten. Friden Model 60 Paper Tape Reader also available.

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Model 70 Workstation

Model 70 Workstation

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Canadian Report Comments on Carrier DP Services

By Don Leavitt
CW Staff Writer

OTTAWA, Ontario – The telecommunications carriers in Canada will probably be permitted, and more likely encouraged, to provide remote data processing services to computer users. The only question now seems to be how the EDP and communications services will be related within the carrier's financial structure.

That at least is the way some concerned Canadians are interpreting a "Telecommission" report recently published by the Department of Communications.

The department says that it prepared the report only as reference material for "public discussion," and for hearings by a committee of Parliament that may, in turn, lead to a statement of government policy sometime next year.

'Policy Options'

But the report includes what the department says are the "policy options," and four out of five options listed allow for remote data processing services to be provided by the carriers or by their subsidiaries.

The report's concern that increasing "north-south communications linked to U.S. computer utilities . . . would seriously constrain the development of an indigenous Canadian industry" has been interpreted by some as further encouragement for the carriers. This appears to be reinforced particularly when coupled with the thought that "the importance of sustaining an east-west axis has been recognized, and appropriate policy measures have been taken" in the development of telecommunications and other "essential services."

The head of an independent data processing firm said that while he could "very much appreciate" the government's concern for the problem of Canadian ownership and control of the DP industry, he disagreed with the "let's let 'the Bell' in because that's going to solve the problem" attitude of the report. In his view, "Bell can't even solve its own problems."

Need More Interaction

An official with one telephone company acknowledged the pro-carrier mood of the report when he told CW that the hardware manufacturers and the pure time-sharing purveyors "will not be able to take this [report] sitting down." He said that "their input" had not yet been heard and "there is a need for more interaction between the various components [of the DP industry] and the Telecommission."

R.T. Horwood, president of Computel Systems Ltd., another computer service company, saw a problem even more fundamental than carrier participation in EDP services: "The report discusses at length the necessity of future investments of many billions of dollars in hardware to ensure the development of a uniquely Canadian computer industry, yet does not consider what demand might exist for the utilization of such hardware."

He added: "Producing hardware or software without a market will not create an industry."

By contrast, William A. McLean, staff supervisor with Trans-Canada Telephone System, said: "We think that the computer industry is in a fantastic growth pattern." He added: "The specifics of [the computer industry], as outlined in the report, should be open to all firms, including the telecommunications carriers, because we think we have developed some internal expertise, over the years, in the data processing part of our own operations.

Communications

"We are using the types of skills, in other words, that would be needed to go into whatever part of [the industry] we would find ourselves asked to go into."

Separate

Specifically, McLean said that if remote DP services are to be provided by the carriers "they should be divorced entirely from the mainstream of the telephone company operations, fully financially self-supporting, but not regulated" in a pattern similar to that proposed for U.S. carriers by the FCC.

Horwood replied: "If the common carriers were to be permitted to enter the DP industry, the report does consider financial regulation through rates and cross subsidization, but does not examine the far more serious problem of regulating the quality of service, in order to guarantee equal quality to both the carrier-owned subsidiary and its independent competitor."

Although Gerald A. Wanless, president of AGT Ltd., said that he is "very sympathetic with the dilemma" that the Telecommission has, in trying to develop a Canadian computer industry, he is not happy with the way in which the report was researched. He said that although the respondents answered the Telecommission's questionnaire, the implications of their answers were not known at the time.

Now, he said: "I don't think that the solution that is being proposed (i.e., that the carriers be allowed to provide remote DP services) is going to solve the problem." Then he concluded: "The conundrum we've got is that we don't know what to propose as an alternative."

The Telecommission, organized last September, has planned inquiries into some 50 areas within telecommunications, including market prospects, regulation, interconnection, and distribution systems.

COMPUTERWORLD

societies/user groups

AMA Show to Focus on Training

NEW YORK – The program of the American Management Association's (AMA) Sixth Conference on Education and Training reveals greater emphasis on industrial and business training.

Held annually in New York to coincide with the AMA Education & Training Exposition, the conference will be held at the Hilton and Americana hotels, Aug. 3-6. The show, occurring at the New York Hilton Aug. 4-6, is expected to include almost 200 exhibitors who will show equipment for both educators and trainers in the business and academic fields.

The new emphasis on training is made possible by separating the conference program into three divisions – a joint assembly and two conferences, one on education and another on training.

The six major topics of the training conference will include individualized training, developing middle managers, organization development, top executive development, and developing minority personnel.

Topics for the academic field will be accountability, early childhood education, educational technology, culturally different learners, the school building of the future, and the drug dilemma.

The theme for the entire conference will be "Individual Development and a Lifetime of Learning."

McGeorge Bundy, president, The Ford Foundation, will be the keynote speaker. His topic will be "What Is Learning and Who Is Learning It?" He will be followed by a symposium on "Educational Consumerism" and a luncheon at which Douglas M. Knight, RCA division vice-president for educational development and formerly Duke University president, will speak on "Education and Training – A Partnership for Using Today's Resources More Effectively."

A new feature will be an additional meeting on "New Developments in Educational Administration" on Aug. 6-7, for educators concerned with administration problems.

Admission to the show is free but visitors may write for Rapid Registration Cards to Clapp & Poliak, Inc., 245 Park Ave., New York, N.Y. 10017. Conference information is available from AMA, 135 W. 50th St., New York, N.Y. 10020.

Afips Establishes Computer Internship

MONTVALE, N.J. – A computer internship program, designed to assist in the development and application of computing technology in developing countries, has been established by the American Federation of Information Processing Societies (Afips).

According to Dr. Richard I. Tanaka, Afips president, "The program, consisting of five grants to be awarded annually, will help make it possible for U.S. candidates to serve for one year at an institution or university in a nation whose computing technology is still in the developmental stage.

"Emphasis will be on the rendering of service in such areas as teaching and in the development of systems programming, applications programming, hardware, and logical design. In addition, candidates will be encouraged to participate actively in cultural activities designed to enhance the understanding between the host country and the U.S."

The program, Tanaka stated, will be headed by Dr. Harry D. Huskey, director of the Computer Center, University of California at Santa Cruz, Calif. 95060. Applications should be forwarded to Huskey no later than Oct. 1, 1970. An Afips committee will select five candidates and five alternates. Selected applications will be sent to the prospective host institutions for their approval. The internships will begin during the summer of 1971.

The program is open to graduate students, with preference given to candidates who are about to receive, or who have just received, their doctorate degrees in computing.

Applicants should send their complete academic transcript; a copy of their doctoral dissertation (if not complete, a statement from their supervising professor should be sent, stating that, in his opinion, the internship would not interfere with the candidate's qualifying for his degree); and a list of four references (two academic references and two character references) who know the candidate personally and who can constructively comment on his ability to contribute to the objectives of the program and to benefit from the appointment. In the case of a married candidate, the spouse's academic background and areas of interest should be included.

$2,000 Grants

Grants will range up to approximately $2,000 each and are expected to cover primarily transportation costs for the candidate. In cases of married candidates, partial transportation for the spouse may be included.

An initial survey indicates that most host countries will probably supply basic sustenance. However, service in some parts of the world may involve some out-of-pocket expenses on the part of the candidate. Opportunities for service are expected to be primarily in Southeast Asia, the Middle East, Africa, and in Latin America.

Candidates interested in areas where English is not the primary language should indicate their level of proficiency in the local language. Candidates should list their first, second, and third choice of countries or regions of interest.

ATA Schedules Workshops

WASHINGTON, D.C. – As part of a continuing program of information exchange, the American Trucking Association (ATA) Management Systems Committee will hold two workshops July 23 and 24 at the St. Francis Hotel in San Francisco.

The initial workshop will discuss "What Motor Carrier Executives Should Know About Data Processing," designed to serve the management systems information requirements of small and specialized motor carriers.

Timely Information

"The management of our smaller regional and local or specialized carriers," said committee Chairman Dewey Williams, "are daily facing the problem of how to get the timely information they need at a cost they can afford." The users of small data processing systems and of qualified data processing service centers, he added, will be emphasized at this workshop by discussion leaders from the motor carrier industry.

Education

Sreb Project Earns NSF Grant, Pact for College Work

ATLANTA – The Southern Regional Education Board's Computer Sciences Project has received an extension grant and a contract from the National Science Foundation (NSF) to continue its work with colleges in the South.

A grant of $50,500 extends an "Experiment on Ways of Supplying Computer Facilities to Small Colleges for Instructional Uses" through Dec. 31, 1971. The experiment is one of 10 regional computing activities which the NSF funded in 1968.

Activities to be conducted during this 18-month period include the preparation of reports on costs and usage for 1969-70 and 1970-71 and four meetings of representatives from the 20 participating colleges.

"The reports generated by this experiment will be very useful to the administrations of the nearly 1,500 small institutions which are faced with decisions relating to acquisition and maintenance of computer facilities," Dr. John W. Hamblen, project director, said.

An NSF contract of $104,173 will support a 24-month survey and analysis of computing activities in the nation's higher education institutions. Activities scheduled under this contract include preparing for NSF publication a report of the 1966-67 inventory of computers in higher education and on related degree programs.

Also planned under the contract are the revision of forms for collecting 1969-70 data on computers in higher education and preparation of these data for NSF publication. Finally, special analyses of 1966-67 and 1969-70 data are planned under the contract as requested by NSF.

The new contract is the third of its kind which Sreb's Computer Sciences Project has had with the NSF during the five years the project has been in operation.

The 20 colleges and universities in the Sreb "Experiment on Ways of Supplying Computer Facilities" include: Wofford College, S.C.; Huntingdon College, Ala.; Loyola College, Md.; Mississippi Valley State College; Millsaps College, Miss.; Queens College, N.C.; Murray State College, Okla.; Houston-Tillotson College, Texas; Maryville College, Tenn.; Transylvania University, Ky.; Xavier University of Louisiana; Centenary College of Louisiana; George Peabody College for Teachers, Tenn.; Eastern Mennonite College, Va.; Fairmont State College, W.Va.; and Atlanta University Center Corp., including Atlanta University, Spelman College, Clark College, Morris Brown College, and Morehouse College.

Experimental CS Class Well Received

By Anne Nolan
CW Staff Writer

EL SEGUNDO, Calif. – An elective computer sciences class has been established at seven high schools in the Los Angeles area and future plans call for a sequential development of courses over a period of time that would include working experience.

The pilot program, which started in March, 1969, and was sponsored by Xerox Data Systems, was initiated by B.J. Hoffman, a behavioral scientist at XDS. The computer workshop was designed to bring computer skills to high school students and was held on Saturdays at XDS facilities.

The course lasted 20 weeks, at the completion of which 130 Compton High School students were graduated. It consisted of two parts: 10 weeks introductory instruction, and 10 weeks advanced instruction, using an XDS Sigma VII. At the end of the introductory portion, the students had a choice of whether or not to continue with the advanced program. Only 5% dropped out.

The second phase, which started last April, will last about five months, and will establish a computer sciences class at the seven high schools – three in Compton and four in Los Angeles – as an adjunct to the regular mathematics curricula.

"We also have had byproducts from the course such as an improvement in the students' English composition and an improvement in their self-evaluation," Hoffman continued. "Because of the change of attitude, students who at one time would say they wanted to become a clerk in a store now respond that they want to become a computer programmer, or a logic designer."

Asked how the experimental program started, Hoffman mentioned that Max Palevsky, formerly president and now chairman of the board of XDS, said that his son was "turned on" last year at the Museum of Science and Industry for the first time in his life. "What did it was a course in computer science," he explained.

Dr. Alonzo Crim, superintendent of the Compton High School District, says that the computer is the "great equalizer. In terms of ability to learn the languages of computers, there are no such expressions as ghetto, disadvantaged, and the heritage of the white man."

An Educator's View

Work With Computer Helps Child Develop Self-Image

By Harvey Elman
CW Staff Writer

CAMBRIDGE, Mass. – "The experience of working with computers can be used to make the children look at themselves in a more objective, insightful, and constructive way," said Seymour Papert, in a recent interview.

Papert, a mathematician and child psychologist, is currently a director of the Artificial Intelligence Laboratory at MIT.

"An educational system must be presented in which technology is not used in the form of machines for processing children but as something the child himself will learn to manipulate, to extend, and to apply to projects.

"Children learn by doing and by thinking about what they do; so the fundamental ingredients of educational innovation must be better things to do and better ways to think about oneself doing these things.

'Power to Invent'

"Computation is by far the richest known source of these ingredients. We can give children unprecedented power to invent and carry out exciting projects by providing them with access to computers, with a suitably clear and intelligible programming language and with peripheral devices capable of producing on-line, real-time action," he noted.

"Thus in its embodiment as the physical computer, computation opens a vast universe of things to do. But the real magic comes when this is combined with the conceptual power of theoretical ideas associated with computation."

Papert feels that computation has had a profound impact by crystallizing and elucidating the many previously subtle concepts in psychology, linguistics, biology, and the foundations of logic and mathematics.

"Mathematics is the most extreme example. Most children never see the point of the formal use of language. They certainly never have the experience of making their own formalism adapted to a particular task. Yet anyone who works with a computer does this all the time.

"We find that terminology and concepts properly designed to articulate this process are avidly seized by the children who really want to make the computer do things. And soon the children have become highly sophisticated and articulate in the art of setting up models and developing formal systems," he said.

Working of Own Mind

"The most important, and surely the most controversial, component of this impact is on the child's ability to articulate the working of his own mind and particularly the interaction between himself and reality in the course of learning and thinking."

An example which appeals enormously to some children with whom Papert has worked is writing teaching programs. These are similar to traditional CAI programs but conceived, written, developed, and even tested (on other children) by the children themselves.

"Incidentally, this is surely the proper use for the concept of drill-and-practice programs. The best way to learn something is to teach it. Perhaps writing a teaching program is better still in its insistence on forcing one to consider all possible misunderstandings and mistakes," he noted.

"I have seen children, bored and alienated by doing arithmetic, who have become passionately involved in writing programs to teach arithmetic and in the pros and cons of criticisms of one another's programs. An example of such criticisms is: 'Don't just tell him the right answer if he's wrong, give him useful advice.'

"Discussing what kind of advice is 'useful' leads deep into understanding both the concept being taught and the processes of teaching and learning," Papert noted.

Extensive Projects

"Children may acquire the ability and motivation to work on projects that extend in time over several days, or even weeks. This is in marked contrast with the usual style of work in mathematics classes, where techniques are taught and then applied to small repetitive exercise problems."

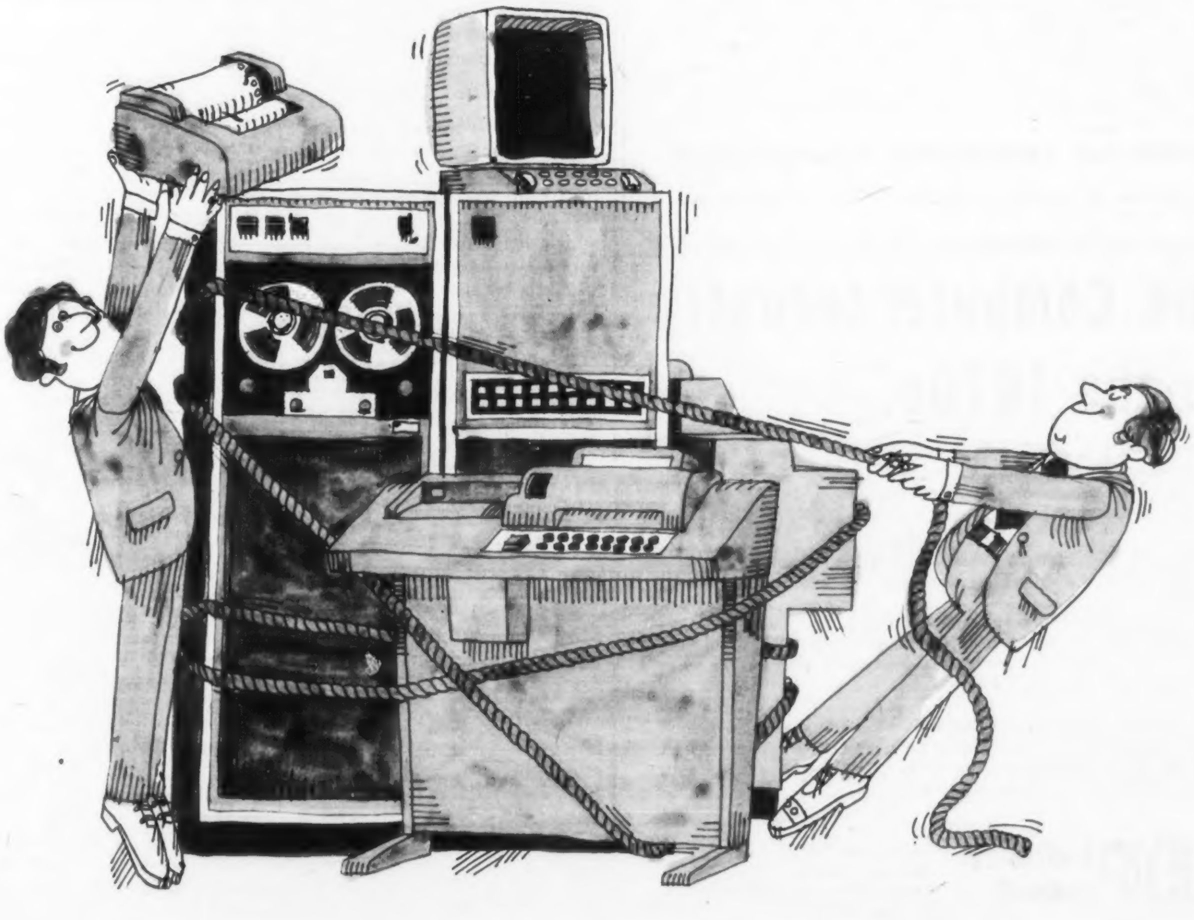
Education

Papert thinks this is closer to the work style of some art classes where children work for several weeks on making an object; a soapcarving for example. The similarity has several dimensions. The first is that the duration of the process is long enough for the child to become involved, to try several ideas, to have the experience of putting something of oneself in the final result, to compare one's work with that of other children, to discuss, to criticize, and to be criticized on some other basis than "right or wrong."

"This sense of creativity," he continued, "is important particularly in helping the child develop a healthy self-image as an active intellectual agent.

"Perhaps the deepest motivational aspect is the value of what the children do being proven by success in their goals rather than by the opinion or edict of a teacher.

"A terrible feature of the classroom is the lack of opportunities for a child to prove his ideas to be correct. They are generally poorly provided with concepts and vocabulary for the representation and discussion of process. They certainly do not have the habit of seeing their work toward solving a problem as an evolutionary process," he said.



Teachers Evaluating Student Opinions As Aid in Assigning Reading Material

By Harvey Elman
CW Staff Writer

JERSEY CITY, N.J. – Teachers evaluate student opinions on books read throughout the school term "at a glance" via computer in a local preparatory school project.

Organized and programmed by two St. Peter's Prep seniors under history department Chairman Michael Gray, the system is limited to use in history courses for the academic year 1970-71 but is expected to be expanded to the English department readings by the fall of 1971.

Each of the books read throughout the year is evaluated by each student under six categories ranging from "knowledge value" to "enjoyability" and including style, length, readability, clarity of presentation and interpretation, understanding value, and overall summary.

Collected Critique

Donald Willenborg and Raymond Marscalowicz use computers at St. Peter's College to obtain the average student rating for each of the books, all of which deal with history from its varied viewpoints. The critiques, which cover history in its political, economic, social form, are collected from students from all four years of high school.

The ratings are fed into the IBM 360/30 which gives back the average opinion or "student attitude" as the two students have deemed this phase of the programming. The computer also returns an overall individual student rating for all the books, based on a one-to-five rating – five being the highest complimentary vote the student can cast.

The survey also registers the number of students who voted on each category and displays each student's name with the comment he provided.

"Students in future years will be able to learn the reactions of their predecessors simply by consulting the computer returns," Gray said.

The system will also aid teachers, he noted, in assigning course texts and related reading material. "We hope the system will eliminate uninteresting and overly abstract books in planning future courses." A concise detailed analysis of this type "will aid the instructor in presenting a more rewarding and enjoyable course for his students."

Manager/Consultant Expects Rise In In-House DP Training Programs

SEATTLE – "It is possible that some of the larger users of data processing equipment will develop their own in-house training programs for data processing specialists. Other industries in the medium bracket of DP equipment users might jointly develop training programs."

These suggestions were presented at the recent DPMA conference session on "Management Methods of Evaluating Training Requirements" by Miss Susan MacAdam, manager of program development and a senior consultant with Hazeltine Data Systems Services, Little Neck, N.Y.

That Is Fact

"Today management has two avenues left open. The first avenue is to turn their computers in and have a competent DP service bureau take over their DP activities. The second avenue is to sustain their own internal computer installation. If the latter is the decision, that installation must also commit itself to DP education. And that is *fact*!

"Unfortunately, the DP profession, from executive management levels on down, is doing little or nothing about overcoming the lack of competent DP professionals. This situation has made a heavy contribution to spiraling salaries and has enabled many DP incompetents to remain hidden behind the skirts of constant job changing," she noted.

Miss MacAdam feels that a DP educational program has three basic phases: evaluation, design and development of educational programs, and implementation.

"It is imperative that the individuals contributing to the DP educational efforts be selected from the cream of the staff. Secondly, there is a tendency, once the educational program has started and has gotten under way, to somehow let it die of attrition. This spells a slow descent of the installations self-dependence and invites the specter of facilities management," she concluded.

Georgia Tech Uses Mini

ATLANTA – "The increasing use of small computers in physics and nuclear engineering requires that our students become familiar with computer equipment," said Dr. Don S. Harmer, professor of these subjects at the Georgia Institute of Technology.

Harmer has initiated a pilot course in data acquisition and control for future physicists and nuclear engineers.

The new Georgia Tech course will use a DEC PDP-12, and other special hardware. "There will be eight hours a week devoted to the course," Harmer said. "Two hours will be used for lectures and demonstrations using the computer as a demonstration tool. The PDP-12 is easy to use with a number of special built-in features for demonstration purposes, including a CRT display, analog to digital converter, relays, and sense switches."

The students will use integrated circuit logic design kits to build logic circuit boards.

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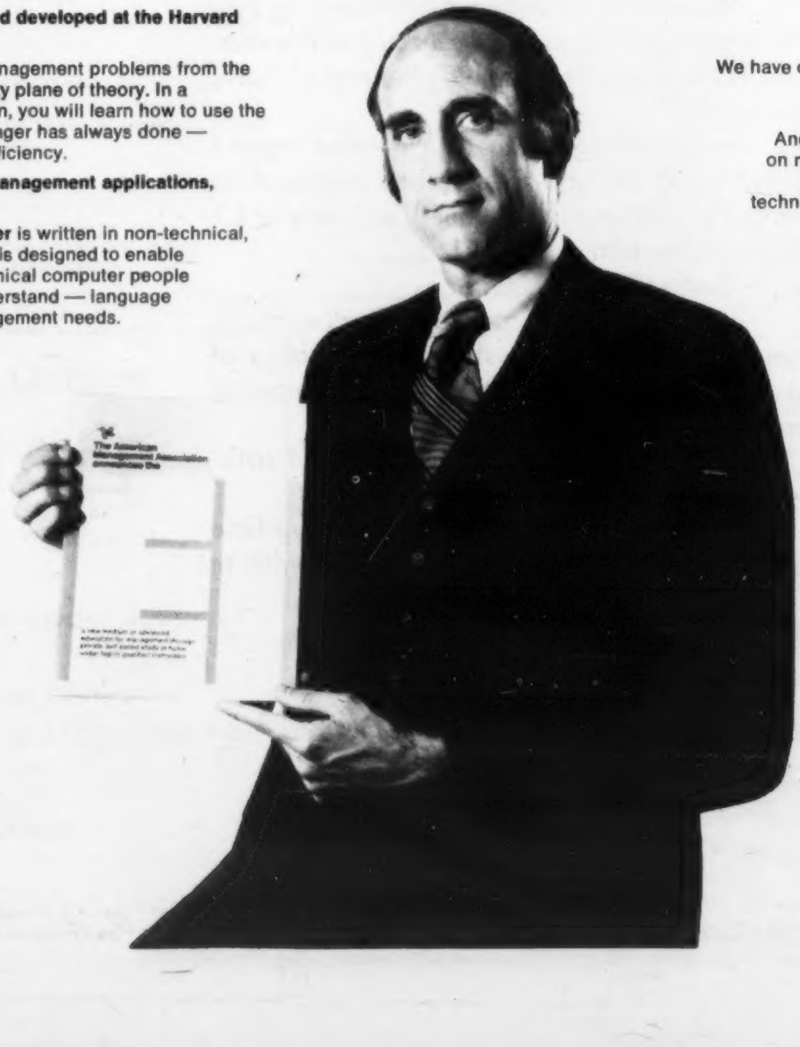

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COMPUTERWORLD

Moving Computers Is Complex Business

By Phyllis Huggins
CW West Coast Bureau

LOS ANGELES – "Computers are much harder to move than Aunt Mary's china," said Bill Struebing, president of Westlake Movers. "It shows up in the insurance. Insurance normally costs 60 cents a pound, but computers have a rate of $5 a pound."

One of the biggest problems, he noted, is making the movers aware of the cost and fragility of the equipment. "Most companies now move their equipment in transparent plastic bags which helps remind the mover to be extra careful. If you drop a couch in one corner, you do a little damage, but if you drop a computer you're probably in deep trouble."

Struebing's firm has been specializing in the business of moving computers since 1940 when it took a look at IBM and decided it was for real. He noted that there have been changes since that time. "We used to move computers into showcase rooms on the lobby floor. Now management puts them on the 15th. They are easier to move today as the equipment has gotten smaller and lighter and much of it is on casters. All IBM equipment is now designed so that it will go through a normal door."

When to Move?

A peculiarity of moving computers is that if a center is moved from one location to another, it is usually done over a weekend or holiday so as to minimize down-time. "The hardest move we ever made was 200 pieces of equipment for Lockheed. It was all done over a three-day holiday, and it rained every day."

Struebing also recalled the precision timing used to move the Los Angeles SBC center. "It was planned using three crews. One crew would dismantle a group of equipment; the next would deliver it to the new site; and the third would move it in. Everything was in series."

Computers have also caused basic changes in the trucking industry. "Our vans now have steel floors so that if the equipment slips, it slips smoothly. The trucks now have air bags instead of springs," said Struebing.

Those planning a computer center would be advised to call in the movers first and let them see the layout to determine whether they can get the equipment in. "We've forced changes in buildings just to accommodate getting the computers in," he said. "Sometimes stair angles are too sharp, there are no ramps for raised floors, etc. But the real fun comes when, to save $1,000 in a multimillion dollar building, the width of the elevator doors is reduced by one foot and we can't get in. Then we have to look for windows, a hole in the roof, or undertake costly and time-consuming modifications to the structure."

Specializing Firms

He also advised users planning to move their centers to consult their manufacturer for the name of a mover since there are firms specializing in this type of work in every major city. As far as geography goes, he said, the most difficult place to move in is New York due to the height of the buildings. "It's really something to see a crane operator who was swinging a demolition ball yesterday hoisting a computer today as if it were a basket of eggs."

The Westlake president concluded that it is foolish not to take advantage of an experienced computer equipment mover while still in the planning stages for a center move.


Moving a computer may be getting easier, but some moves still remain tricky.

Two Potter Units to Handle Leasing of Peripherals

PLAINVIEW, N.Y. – Potter Instrument Co. Inc. moved into the peripherals service and leasing fields with the recent formation of two new subsidiaries here.

The Potter Data Products Service Inc. will be responsible for customer service and field maintenance of all Potter equipment in user sites as well as equipment purchased by OEM customers, while Potter Data Products Corp. will handle all equipment lease agreements on the firm's IBM 360 compatible peripherals.

William P. Sharpe, who will serve as president of the maintenance subsidiary, indicated that the firm will provide customers "not only with fast field service, but also preventive maintenance programs designed to keep their systems on-line by eliminating down-time."

The new leasing subsidiary will be directed by John T. Potter, who also serves as president and chairman of the board of the parent firm. He said that the new firm will lease IBM compatible tape units, tape control units, disk control units, and KDR key-to-tape data entry devices.

The two moves represent "another phase in the growth and expansion of Potter Instrument Co. into the data processing user market," according to Potter.

Post Office Bureau Awards REI Contract for OCR Mail System

DALLAS – The Bureau of Research and Engineering of the Post Office Department has awarded a $6.9 million contract to Recognition Equipment, Inc. (REI) for the development of an advanced optical character recognition (OCR) system to be installed in mid-1972 in a major post office facility.

Recognition Equipment will deliver an optical reading and sorting system which will process up to 86,000 letter-sized envelopes an hour.

The computer-controlled system will utilize "advanced reading technologies" to read addresses optically from letter-sized mail, then sort the envelopes for delivery. The reader will find an address located at various places on an envelope face and will be capable of reading through "address windows" often used in business mail. It also will disregard extraneous information on an envelope, REI said.

Through a technique known as context analysis, the system will be able to identify correctly addresses that may include misspelled words.

For example, if an address contains the word Bofton instead of Boston, the reader will make the correct identification and process the envelope to the proper destination. The system also will be able to piece together incomplete address information for accurate processing.

The Post Office Department awarded the contract to Recognition Equipment after extensive study by the Bureau of Research and Engineering of various proposed OCR systems. In mid-1968, the bureau awarded Reeognition Equipment a $500,000 study contract for preliminary development, of OCR and sorting machines.

UCC Launches Joint Venture Plan Abroad

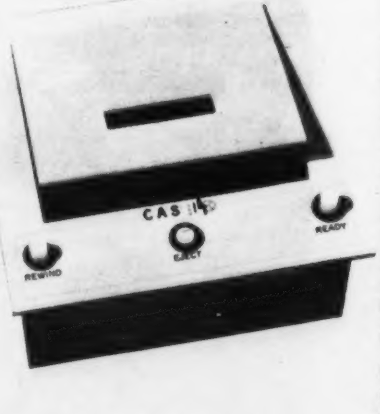
DALLAS – UCC International, Inc., a wholly owned subsidiary of University Computing Co., has launched a joint venture program to establish computer utilities in foreign countries, announced Richard G. Fagin, president of UCC International.

Fagin also announced that Warren D. Beamish, recently named a UCC International vice-president, will administer the new program.

The joint venture program was created to realize UCC's goal to form computer utilities in certain countries where it is advantageous from either a financial or legal standpoint to operate a jointly owned company. The computer utilities will be modeled on UCC's computer centers in the U.S.

Each foreign company will be aligned with the governmental and industrial interests of the country in which it is organized. Each company will draw upon the utility technology developed by UCC and will also market the UCC Cope, Fasbac, and Datel terminal systems and other computer related products.

UCC will participate in the investment and management of the joint venture companies, which may be privately or publicly held in their respective countries. The new companies will provide computer education, programming, and consulting services in addition to their full-scale computer utility operation.



CPMA Head Scores GSA, NBS on Contract Bidding

CW Washington Bureau

WASHINGTON, D.C. – Independent peripheral equipment manufacturers are still not receiving a "fair shake" in bidding on large government data processing contracts, according to L. Richard Caveney, president of the Computer Peripheral Manufacturers Association (CPMA).

In recent testimony before the Senate Subcommittee on Economy in Government, headed by Sen. William Proxmire (D-Wis.), Caveney blasted the General Services Administration (GSA), which coordinates civilian EDP procurement, and the National Bureau of Standards (NBS), which sets standards for government computer purchases.

"Dealing with the electronic data processing group within GSA is really an experience," Caveney claimed. "Receiving a federal supply contract is like climbing to the top of Mt. Everest without any equipment or assistance.

"It is the (peripheral) association's firm belief that GSA could be more flexible in negotiations with the peripheral community instead of trying to make us fit the total computer manufacturer's requirements and giving us the feeling they wish we would go away," he added.

Caveney said that independent peripherals firms have received only "token" contracts in the past three years. He added: "I know personally a few awards were achieved reluctantly from GSA because of Congressional insistence, which should not have to be applied if sound procurement and management ethics were being adhered to."

Caveney's criticism of the role of the National Bureau of Standards was equally as strong. "The NBS," he said, "has not done a good job. Everybody assumes that 'Snow White (IBM) and the seven dwarfs' (other mainframe manufacturers) set the standards. It should be the other way, with an unbiased source setting standards for industry leaders to follow."

In other testimony, Heinz A. Abersfeller, commissioner of the Federal Supply Service of the GSA, claimed that his agency had indeed initiated cost-saving programs and had opened bidding to peripheral manufacturers. He cited a recent case where independent peripheral producers were invited to attend a vendors' conference for a major federal computer procurement; only one peripheral equipment maker attended.

Caveney, however, hinted at "some hanky-panky" possibly regarding procurement practices, and added that "if ethics appear not to be the rule, then the CPMA will have to counter with the 'goodies' we have in our medicine bag."

He said there is "one major area of savings within the EDP area in government which needs the immediate attention of Congress." This area, Caveney explained, is software costs, which he said the Comptroller General of the U.S. estimated at about $3 billion.

"This estimate of federal software costs is grossly understated, since GSA computes software costs for the Comptroller General by multiplying the number of people on duty as programmers by their average grade salary. This is comparable to considering the average salary of carrier pilots as the software costs required to maintain a wing of carrier aircraft (the hardware) at sea."

Caveney added that "responsible estimates place the potential savings at $3 billion of the government's true (software) costs."

Proxmire's subcommittee is one of several on Capitol Hill that hold periodic hearings to examine federal procurement of computer equipment – purchases which total some $2 billion per year, according to the federal inventory. Further hearings on EDP procurement are expected in the near future from Rep. Jack Brooks' (D-Texas) Subcommittee on Government Activities, according to Congressional sources.

IBM '50s Invention Gets Patent Related To Graphic Display

POUGHKEEPSIE, N.Y. – An invention that formed the conceptual basis of an electronic calculator of the '50s and is still being used extensively in modern graphic display devices has been patented by IBM.

The patent is for a design consisting of a keyboard-operated computer with magnetic disk storage and a CRT device for storage display. The design was successfully incorporated in the IBM 610 electronic calculator. The patent application was filed by IBM inventor John J. Lentz almost two decades ago. Lentz is employed at the Thomas J. Watson Research Laboratory in Yorktown Heights.

The concept contained an electronic "marker" that automatically indicated, on the face of the CRT, the position in storage at which data recording was about to take place. After each recording, the marker – an illuminated spot – shifted to the next recording position.

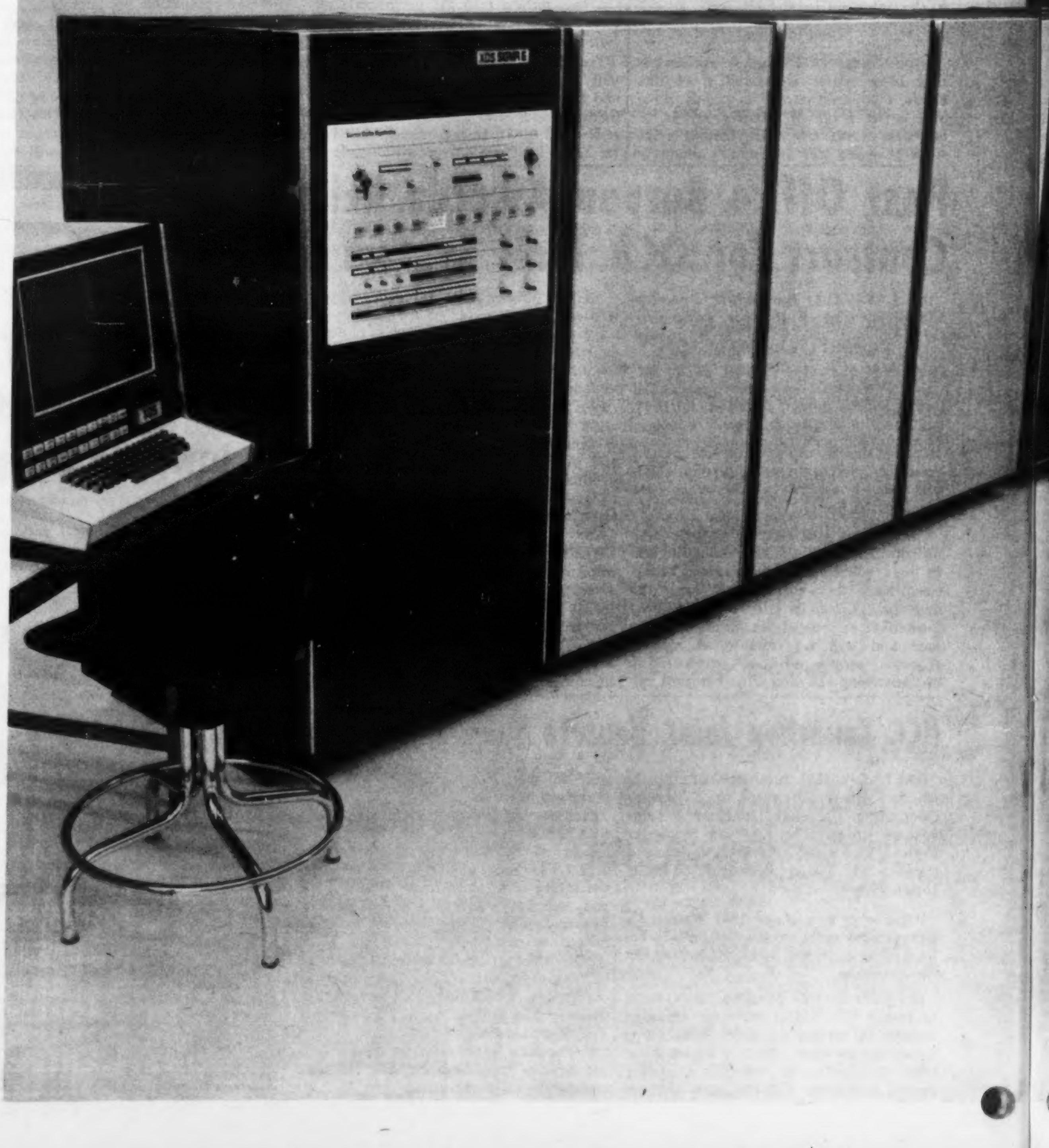
Although the 610 is no longer marketed, the same illuminated spot technique is used in today's CRT storage display devices to indicate where data is being entered.

ICL Production Push Begins for Completion Of 15 1906A Orders

LONDON – The largest computer made by ICL, the 1906A, is now in production at the firm's West Gorton, Manchester, factory. The machine is said to be roughly comparable in size to the Univac 1108 or the IBM 360/75.

Fifteen machines are on order with a total value of $40.8 million. Six are currently being commissioned, and the first two are scheduled for delivery in September to Oxford University and to the British Aircraft Corp., Weybridge. Even though the 1906A is a general-purpose system, the first deliveries will be used primarily for scientific applications.

To produce the 1906A, ICL developed a computer-aided design (Cad) program, which uses a total of about 400,000 instructions, with about half of these specific to the 1906A. The Cad system, which keeps a 1904, a 1905F, and a 1907 fully occupied, converts logic design files into physical layouts and provides layouts for the printed circuit platters, wiring and circuit diagrams, data, and full documentation.



Honeywell Plans D.C. Facility

WASHINGTON, D.C. – Honeywell has made plans to build a 13-story building in the Westgate Industrial Park near the Dulles Airport.

The building will house Honeywell's computer facilities and sales offices, combining the operations currently in Rosslyn and McLean.

Honeywell also formally opened its 3,500-sq-ft Washington Data Center. The Rosslyn facility will specialize in offering computer time-sharing to small- and medium-sized businesses, including inventory control, payrolls, working scheduling, and accounting.

Currently 200 Washington area firms use the $2 million facility. Honeywell officials expect to double the service activity by Jan. 1, 1971.

The center's services include contract software and consultation in business computer systems.

Expansions

Other Expansions

Industrial Electronics Research Enterprises, Palo Alto, Calif., has moved into a new 10,000-sq-ft building. The firm, with a staff of 21, makes computer terminals, high resolution cathode ray display systems, and other electronic goods.

Computer Sciences Corp. has completed the second stage of an expansion of its installations in Moorestown, N.J. area with the addition of a facility in Marlton. The new facility houses a Navy computer, the AN/UYK-7, designed for use in shipboard weapons systems. Computer Sciences' complex of facilities in the area will be brought together into a 30,000-sq-ft two-story building at East Gate Industrial Park, Strawbridge Lake, Moorestown, early next year.

Orders and Installations

Data Instruments, Inc., Sepulveda, Calif., has placed a $1 million order for 100 minicomputers with Computer Automation, Inc. The computers, CAI's Models 808 and 208, will be used in Data Instruments' Dataplex business data entry systems.

San Mateo County General Hospital has purchased Western Operation Inc.'s Health Information Base System (Hibs). Hibs will provide service in such areas as in-patient and out-patient billing, automatic insurance proration, patient census and location, accounts receivable and collections, revenue accounting, cash reporting, and professional billing.

Missouri Pacific Railroad, St. Louis, Mo., has installed the Data Project Management System (DPMS) of Lutter and Helstrom, Inc. The DPMS provides the project cost control data and early warning that is required when the DP function reports to a cost-conscious company management.

Ampex Corp. has delivered $225,000 worth of Model TM-1624 digital tape drives to Potomac Electric Power Co., Washington, D.C., for on-line operation with IBM 360/40 and 360/50 computers. The computer system is used for engineering studies, customer billings, and other applications.

Com Dyne Systems, Inc., Hillside, Ill., has completed negotiations with the Texas-West Indies Development Corp. for installation of Com Dyne's Comput-a-Bill medical information system for the Kansas City, Dallas, Los Angeles area. Backed by TRW, Inc., the firm will use the license to establish full DP service contracts for the health care field.

General Grocer Co. of St. Louis, Mo., has completed installation of a Honeywell 1250 computer to replace its H200 model. Honeywell has also received orders of Series 200 computer systems from three needle-trade manufacturers. Guilford Mills, Inc., Greensboro, N.C., and Hortex, Inc., El Paso, Texas, have ordered Model 125 tape-disk systems. Van Heugten, Scherpenzeel, Holland, has ordered a Model 1250 disk computer system.

Univac 9400 computers have been installed by Johnson Motor Lines, Charlotte, N.C.; Northern Electric Co., Waynesboro, Miss.; and Hansen Publications, Miami Beach, Fla. Univac 9200 systems have been ordered and installed by Tarrant Savings Association, Fort Worth, Texas; Surety Savings, Houston; Murphey Favre, Inc., Spokane, Wash.; Smithtown Central School District, St. James, N.Y.; the University of Rochester, N.Y.; Pierce & Stevens Chemical Corp., Buffalo, N.Y.; School Pictures, Inc., Jackson, Miss.; and Mercy Hospital, Vicksburg, Miss.

The computing center of the University of Southwestern Louisiana, Lafayette, La., has installed an RCA Spectra 70/46 digital computing system. RCA made a grant of $800,000 towards the cost of the $1,500,000 facility.

Philip Morris, El Segundo, Calif., has ordered a Xerox Data Systems Sigma 5 computer to research and develop its tobacco, chewing gum, personal grooming, and hospital products.

Minnesota Hospital Service Association (Blue Cross) has installed three new Honeywell computers to reduce administration costs and to provide faster service to its nearly one million subscribers and 183 member hospitals throughout the state.

Two RCA systems totaling $3 million have been ordered by educational institutions in South Carolina and Colorado. The South Carolina State Department of Education will utilize a $2 million RCA Spectra 70/55 to serve as the major part of a computerized network for the entire state education system. In Colorado, the public school systems of Jefferson and Boulder Valley Counties plan to employ a $1 million RCA Spectra 70/45 system in a pilot program for CAI.

Bell Telephone Laboratories has ordered a Control Data 3500 system for its Holmdel, N.J. Research Laboratory to aid scientists in the development of communications systems and the design of communication filters and networks. United States Steel Corp. of Pittsburgh has installed a Control Data 6500 dual-processor system to handle engineering, scientific, and business computation.

Georgia Bank & Trust Co., of Macon, Ga., has installed a Burroughs B350 valued at $230,000.

The McCall Information Services Co. is installing an IBM 360/40, due to increasing workloads in subscription fulfillment.

Director Recap

Jack Hartigan, cofounder of Components Inc. and president of Phoenix-based Educational Computer Corp., has been elected a director and named secretary-treasurer of Phoenix Data Inc.

Miss Jacqueline Sher has been named chairman of the board of directors at Madjac Data Co.

Brandon Applied Systems, Inc. has elected James J. Groberg to its board of directors.

Dialog Computing, Inc., has appointed three new board members: Jackson T. Stephens, president, Stephens Inc.; Raymond Rebsamen, president, Rebsamen Associates; Jean H. Felker, director, Colonial Life Insurance, Inc., and Shulman Transportation Enterprises, Inc.

John H. Wendelboe, treasurer of Datacraft Corp., has been elected to the board of directors of that company.

Gerard A. Cahill has been elected treasurer and named director of Hetra, Melbourne, Fla.

Wankier to Direct Marketing at Meta

IRVINE, Calif. – Metacomputer Sciences Inc., a firm concentrating exclusively on computer applications in the printing and publishing industry, has named Marc T. Wankier as vice-president and director of marketing.

Wankier will be responsible for the marketing of such specialized services as computerized photocomposition, time-sharing computer typesetting services, terminal devices, and software aids for the graphic arts industry.

Wankier's professional career has been devoted almost entirely to the marketing of data processing and aerospace products. Before joining Meta, he was head of marketing for Jacobi Systems, responsible for the sale of computer-based control systems and automated test systems.

Before that he had been systems sales manager for Stromberg Datagraphics Inc., and western regional marketing/sales manager for Bunker-Ramo Corp.

An electronic engineering graduate of California State College at Long Beach, Wankier started his career with North American Aviation and Hughes Aircraft as a research engineer.

Contracts

Two U.S. Navy missile fire control systems will be modernized with new computers and related electronic equipment under an $8.2 million contract with Univac's Federal Systems Division.

Univac and Ordnance Command spokesmen said the contract calls for production of the Navy's Mark 152 computers – the Univac 1219B – to modernize fire control systems of the Tartar and Talos missiles.

ZVR Systems, Inc., New York, has been awarded a contract for developing an information system for multiphasic health testing by Health Service Systems, a division of Food and Drug Laboratories, Inc. Terms of the agreement were not disclosed.

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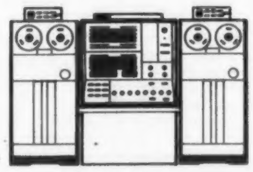
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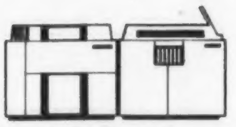
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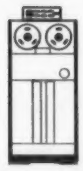
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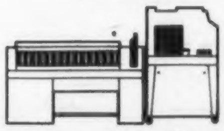
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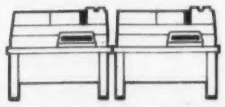
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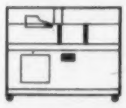
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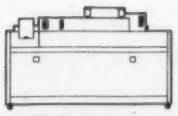
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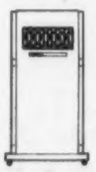
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Dear Reader:

Computerworld is expanding — and we're excited about it.

With our August 5 issue, CW will begin to carry a new section called "**Computer Industry**," making us the first publication to carry all the news of interest to personnel engaged in the design, production, application analysis, programming, and use of computer systems, and in the industry that supports these activities.

Computerworld now truly serves the ***full*** computer community.

We will continue to cover all the news of interest to users of data processing equipment. Our coverage in this area has already made us the fastest growing and most widely read user publication – all in just three short years.

At the beginning of the computer business – not so long ago – it was possible for designers and marketing people to meet with users for a personal exchange of information.

But today all that has changed.

The computer industry is now the fastest growing in America, and even sharper growth curves are being charted in Europe and Asia. It is rapidly becoming the largest single industry in the nation and should outpace even the automobile industry by the 1980's. In the U.S. alone, users have grown from a few limited pioneers using a handful of computer "systems" for exotic applications to more than 250,000 people using over 50,000 computers, and processing almost every conceivable type of job.

And more advances are on the way.

At this time the computer industry finds itself in a paradox. It is at once the mainstay of the burgeoning information explosion and at the same time starved for information – information of all types on marketing, manufacturing, design, and specialized applications.

The information is there, but, to date, no effective medium has been developed to disseminate the data quickly, concisely, and accurately. Therefore key developments in subsystems often go unnoticed, until too late; market opportunities are missed, because they are not known; and, possibly worst of all, duplication abounds needlessly, resulting in wasted research and money.

Our new "Computer Industry" section will change all that.

The section will carry all of the news about subsystems used in computer and peripheral gear, in addition to all of the information about complete systems (such as terminals, memories, displays, etc.) offered on the OEM marketplace.

The section will keep system designers alert to product advances. It will spotlight for OEM executives new business opportunities and provide in-depth analyses of present markets. There will also be information on competitive products and where they are being sold, as well as all of the information on the huge government market – federal, state, and local.

We will also feature in-depth interviews with personnel involved in exploring new technologies or responsible for widening market horizons.

All of this information will be packaged concisely, and presented in a timely fashion. All the news available in time to use it.

For the first time, there will now be a publication that truly serves the entire range of people involved with computers and their uses – the ***full*** computer community.

We are convinced that the people within the computer community can benefit from usable information on the computer industry. The need for this information is too great to continue to isolate it in a few specialized publications. Again – as it did three years ago with a weekly newspaper – ***Computerworld*** is leading the way.

We expect you will find "**Computer Industry**" a very valuable extension of ***Computerworld***'s service to you.

Cordially,

Patrick J. McGovern, Publisher

Earnings Wrap-Up

IBM Revenue Rises Slightly, Burroughs Posts Gains

By Michael Merritt
CW Staff Writer

NEW YORK – The second round of 1970's earnings battle has started, and though perhaps bloodied, the computer industry looks remarkably unbowed. IBM, Burroughs, Systems Engineering, Viatron, and Farrington manage to cover the entire range of earnings news, from fantastic to mediocre to downright awful.

IBM Earnings

The big news, of course, is IBM, whose earnings report is a State of the Union message for most of the industry. The Colossus of Armonk is still running behind its 15% earnings growth target, reporting a rise in net of only 6.1% for the quarter and 8.6% for the half.

The second quarter figures showed net income of $252.1 million or $2.22 a share on revenues of $1.87 billion. For the second quarter of 1969 income was $237.5 million or $2.09 a share on revenues of $1.83 billion.

While net for the quarter rose 6.1%, revenues grew only $40 million, or 2.1%. The earnings growth is certainly a testimonial to IBM's ability to make money under any conditions, but the lagging revenue is a more revealing indicator of the problems of the industry.

IBM has certainly had its own problems selling this year – particularly weak 360 sales and orders delayed in anticipation of the 370 – but when a company that could sell refrigerators to penguins can boost revenues so little, you know that things are bad.

The first half figures for IBM show net up to $482.4 million or $4.24 a share, from $443.5 million or $3.91 per share. First half revenue crawled up 2.2% to $3.59 billion from $3.52 billion.

In his letter to shareholders, IBM Chairman Thomas Watson Jr. noted that while outright sales fell in the first half, revenue from rentals and services rose 18.8%. In a similar statement following the first quarter report, Watson said he thought the rental and services figure a better indicator of the company's growth than the sales or total revenues figures which were disturbed by a transient peak of sales to leasing companies in 1967 and 1968.

Burroughs Rolls Along

Better news comes from Detroit. Burroughs Corp. has reported net earnings up 23%, revenue up 15%, and total worldwide backlog up 4% for the six months.

Net earnings for the half were $25.3 million, up from 1969's $20.7 million, while per share earnings rose from $1.25 to $1.47. Six-month revenue was $402.8 million, up from $351.3 million.

Second quarter net was $15.6 million or 91 cents a share, up 20% from the $13.1 million and 79 cents a share for the year-earlier period. Second quarter revenue rose 13% from $188.2 million to $213.6 million.

Burroughs Chairman Ray W. MacDonald disclosed that orders for EDP products, systems, and services rose 10% for the 1970 six-month period. He also said that in 1970 the number of EDP systems ordered rose 17% while order value rose 10%, revealing that there is a trend to smaller-, lower-priced systems in Burroughs sales.

Burroughs has been a quiet star, merrily turning in some of the best performances of all the prima donnas of computer systems manufacturers. Though, like the others, Burroughs has been hit with rotten tomatoes in the stock market, it may well be because of the play it's in rather than its own acting.

On the Other Hand

After a long delay blamed on accounting problems, Viatron Computer Systems has turned in a disappointing second quarter report.

For the half, the company's net loss grew from $2.3 million to $5.8 million, which does not include $1.5 million of capitalized R&D expenditures. Viatron changed its accounting policy from expensing to capitalizing R&D this year, and if it is added in, the total loss for the half comes to $7.312 million, which is working up toward the company's $9.4-million loss for all of 1969.

The lack of sales growth is just as disappointing. Again for the half, sales were $996,000, up from $248,000 for 1969. While this is great on a percentage basis, in absolute value it is only an increase of $748,000, and sales for the half haven't even cracked the million-dollar level.

For the second quarter, sales were $772,000, up from $154,000 in 1969, and the net loss was $2.9 million, up from $1.4 million.

A Viatron spokesman admitted that the half figures were lackluster, but expressed hope for the second half of the year.

Farrington Out of Business?

The real bomb of the current crop hit when Farrington Manufacturing Chairman Peter F. McCloskey reported that his company lost $5.1 million in 1969.

In 1968 the company had a net profit of $324,823, or six cents a share.

McCloskey said the loss was due to an "inventory discrepancy" which has yet to be explained, reserves set up to cover inventory problems, and losses in all four quarters.

The problem is apparently quite serious for the OCR maker, since McCloskey said that Farrington has been contemplating selling part, or all of its operations and will begin exploratory talks with several companies soon. In addition, the company has had to default on its long-term debt.

An outside indication of Farrington's problems is the fact that its accountants were unable to express an opinion on the consolidated financial statements.

SEL Sees Rise

In another preliminary statement, this one for the full year, Systems Engineering Laboratories said it expected to earn over $1.85 million, or over 80 cents a share, for the fiscal year ended June 26, up from $1.45 million, or 70 cents a share, for last year.

In a speech to the Information Processing Industry Analysts Association, SEL Chairman S.P. Eglash said that revenues should rise to about $21 million from $17.3 million last fiscal year.

The preliminary figures represent an increase of more than 20% in revenues and over 25% in net income over the corresponding period a year ago. Complete, audited financial results for the past year should be available during the last week in August.

Although reluctant to be specific on the outlook for the next year because of current economic conditions, Eglash said: "Over the short term, Systems is looking toward a difficult first quarter. Incoming orders for the past year increased to record highs but a larger increase in shipments has reduced the company's firm order backlog. For the entire year, however, we expect to achieve continued growth in revenues, profits and orders."

Levin-Townsend, IBM Settle Dispute; Levin Drops Fight, to Take Post in Firm

NEW YORK – It looks as though the Battle of Levin-Townsend is over. Townsend, Levin, and IBM have signed a truce.

Levin-Townsend Computer Corp. and IBM have agreed on a revised schedule of payments on L-T's debt, and L-T has pledged EDP equipment and stock in two subsidiaries as security for its debt to IBM. An L-T spokesman said that "substantially all Levin-Townsend's assets including almost all its computer equipment are presently encumbered to IBM and others."

In turn, IBM has withdrawn repossession notices it had sent to three L-T customers.

Both L-T and Howard S. Levin have agreed to "release IBM from all claims" including antitrust suits filed by both against IBM.

Meanwhile Levin and James E. Townsend have settled their dispute. Levin is withdrawing his proxy fight and will support a compromise slate of directors at the company's annual meeting late in August.

The board will be expanded from five to nine directors, and Levin will remain a director and become chairman of the finance committee. Townsend will remain a director and president of the company. Levin is also settling his claims and suits against L-T and its board that sprang from his dismissal as head of the company last January.

Townsend said that the company's year-end report would be released shortly and would show nonrecurring losses. He noted that the company is now current in payment of all indebtedness, but that "among other problems, the company has substantial short-term indebtedness, some of which may have to be refinanced."

War History

The first indication of the Six-Month War to become public was Levin-Townsend's nine-month report for 1969 released in January, 1970. That report showed a loss of $15.9 million, primarily from writeoffs of bad investments.

Shortly after, Howard S. Levin was fired from the chairmanship of the company and replaced by James E. Townsend, the other founder of the company. Levin began preparations for a proxy fight to regain control of the company.

Meanwhile it became obvious that L-T was in the middle of an immense cash flow problem. It was behind on payments to IBM for computer equipment to the tune of $15 million, and its total debt to the manufacturer was $49 million.

L-T management began a round of talks with a number of companies seeking some form of new financing, negotiating with and being rejected by Boothe Computer Corp., Randolph Computer Corp., Standard-Prudential Corp., and GAC Corp.

For a time IBM didn't press L-T for payments while it negotiated for fresh money, but eventually it began repossession activities only to be halted by an antitrust suit filed by L-T. Levin, meanwhile, had filed his own antitrust suit against IBM on behalf of L-T and its shareholders.

Part of Airlines Division Acquired by Control Data

MINNEAPOLIS – Control Data Corp. has acquired part of the Airlines Division of Computer Communications Network, Inc. The purchase price was not disclosed.

The Airlines Division, in Atlanta, will provide data service for the airlines industry, including seat inventory and availability and passenger name record (PNR) capability. Present customers of the Airlines Division who will be served by Control Data are three major regional airlines, including Southern Airways, Piedmont Aviation, and Texas International Airlines. Other customers are Shawnee Airlines, Altair Airlines, and the North American offices of Scandinavian Airlines System (SAS).

As a result of this acquisition, Control Data becomes the first major computer manufacturer to provide a shared system service dedicated to the airlines industry.

Control Data said that the acquisition is in keeping with the company's objectives to serve the information-handling needs of this industry. The company will provide the subscribing airlines with PNR capability without the necessity of having its own computer system.

Each carrier will be linked to Control Data's Atlanta installation through a real-time, on-line network and will employ terminal devices at the carriers' offices, agents' desks, and reservation centers.

Com-Share Report Says Condition Is 'Improved'

ANN ARBOR, Mich. – Troubled Com-Share, Inc. said that "the financial condition of the company has improved materially since March 18 when the company announced its inability to pay a $500,000 debenture due Feb. 28 and a lack of funds to meet current operating expenses."

Since that time the holder of the debenture has extended the due date to March 31, 1971, the time-sharing firm revealed. In addition the company recently completed the sale and lease back of computer equipment valued at about $3 million.

For the six months ended Dec. 31, Com-Share reported an operating loss of $1.8 million, compared with a loss of $1.2 million for the year earlier.

Singer Agrees to Buy $6.5 Million of Cogar Notes

HERKIMER, N.Y. – The Singer Co. is backing Cogar Corp., a computer memory maker, to the tune of $6.5 million.

Singer will buy 15-year Cogar convertible notes bearing an interest rate of 7.5%. The conversion rate of the notes will be either $65 or $45 of notes per share of Cogar common depending on Cogar's earnings in the year ending Dec. 31, 1972.

According to a Cogar spokesman, definitive terms have yet to be prepared and approved. He also revealed that top Cogar management will purchase an additional $1 million of the notes.

Cogar currently has 1,940,261 shares outstanding. If all of the $7.5 million of notes were converted at the $65 price, this would provide 115,384 new shares, or a dilution of 5.9%; at the $45 price there would be 162,222 new shares for a 8.4% dilution.

A Singer spokesman said: "Our company is committing these funds to Cogar both on its merits as an investment and because Cogar is working with our Friden Division to provide an important new product of advanced technology which we will announce early in 1971." He declined to comment on the nature of the development.

For the fiscal year ended Sept. 30, 1969, Cogar registered an operating loss of $1.8 million on sales of $55,000.

Entrex Completes Initial Financing, Announces Marketing Plans for 480

LEXINGTON, Mass. – Entrex, Inc., a new entry into the data entry terminal field, has found about $1 million in new financing.

Two-thirds of the amount will be split evenly between straight debt with warrants and new equity, while the remaining third is performance-option equity. Participating in the new funding are the First Capital Corp. of Chicago, FNCB Capital Corp., Becker Technological Assoc., and a private estate.

An Entrex spokesman also said prototypes of the Entrex 480 data entry system are near completion and that a model should be running on a trial basis by Sept. 1. Plans call for production to begin Oct. 1, and a production rate of two per month by the end of the year.

The firm also said that it is seeking an OEM supplier to market the 480 as well to develop its own sales force.

According to Barry M. Harder, Entrex president, "this fresh capitalization will enable us to accelerate deliveries of the Entrex 480 data entry system and make it available in quantity as planned.

"The completion of financial arrangements," he continued, "means we are now in high gear and will be expanding to meet the increasing demand for multi-keyboard-to-magnetic tape input preparation systems."

The Entrex 480 is a CRT-to-disk, data entry/verify/edit system with magnetic tape output.

Topas Computer and Unit Suspend Operations, Cite Liquidity Crisis

NEW YORK – Both Topas Computer Corp. and its 60%-owned Allied Data Processing Inc. subsidiary have closed up shop.

Robert S. Topas, president of both companies, said: "We have been victims of the current liquidity crisis. Both Allied and the parent company have large obligations, and we have been unable to collect substantial receivables or to obtain needed financing."

Topas added that Topas Computer's other two subsidiaries, Fleet Leasing Inc. and Corporate Computers, Inc., will continue operations, according to present plans. Corporate Computers is a broker-dealer of used computer equipment and Fleet Leasing is in the auto leasing business.

Topas noted that the two may have to be sold to pay off the parent company's debts.

Allied Data was a computer service bureau and software house.

The revenue of the parent and subsidiaries in 1969 totaled $3 million with net earnings of $109,000, or 14 cents a share.

Earnings Reports

CAVANAGH LEASING CORP.
Three Months Ended March 31

	1970	a1969
Shr Ernd	$.76	$.47
Revenue	21,301,928	17,311,887
Earnings	3,611,779	1,988,527

a-Restated for acquisitions.

SMC COMPUTER SERVICES, INC.
Three Months Ended May 31

	1970	1969
aShr Ernd (Loss)	($.02)	$.03
Revenue	$59,983	33,624
Earnings (Loss)	(9,591)	1,343
9 Mo Shr Ernd (Loss)	(.02)	.30
Revenue	160,191	92,520
Earnings (Loss)	(10,092)	12,077

a-Earnings per share have been computed on 449,858 shares for 1970 and 40,000 shares for 1969.

CORPORATION S
Six Months Ended April 30

	1970	1969
Revenue	$707,000	$399,000
Loss	1,428,000	226,000

DATA GENERAL CORP.
Three Months Ended June 6

	1970	1969
Shr Ernd	a$.08	.....
Revenue	1,894,000	.....
Earnings	b202,000	.....
9 Mo Shr Ernd	a.16	.....
Revenue	4,422,000	......
Earnings	b509,000	.....

a-Based on income before tax credit. b-Equal to 10 cents a share in the 3 months and 26 cents a share in the 9 months.

IMC MAGNETICS CORP.
Year Ended Feb. 28

	1970	1969
Shr Ernd	$.65	$.74
Revenue	9,246,131	9,082,768
Earnings	423,180	462,503

Pro forma per-share earnings assuming conversions, etc., as reported by company, were 65 cents in 1970 and 73 cents in 1969.

MANAGEMENT DATA CORP.
Three Months Ended May 31

	1970	a1969
bShr Ernd	$.21	$.1
Revenue	2,475,464	1,892,732
Earnings	211,376	162,720

a-Restated to reflect issuance of contingency shares and for acquisition in December, 1969, on a pooling-of-interest basis of Aptitude Testing Inc. b-On primary share basis. On a fully diluted basis per share earnings were 21 cents in 1970 and 15 cents in 1969.

CORNING GLASS WORKS
Six Months Ended June 14

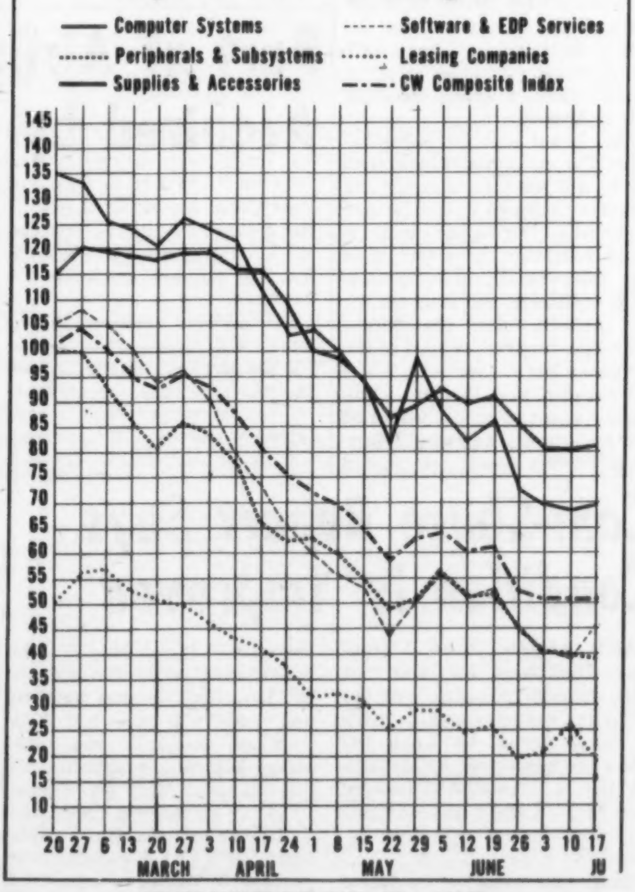
	a1970	b1969
Shr Ernd	$3.08	$3.77
Revenue	268,779,462	242,515,754
Earnings	21,270,650	25,947,420

a-Includes four foreign companies in which a controlling interest was acquired after June 15, 1969. b-Includes special dividend from a foreign associated company which amounted to $1,516,694 or 22 cents per share.

GENERAL AUTOMATION INC.
Three Months Ended April 30

	1970	1969
Revenue	$1,882,000	$467,000
Loss	599,000	286,000
9 Mo Revenue	4,595,000	1,089,000
Loss	1,659,000	554,000

Computer Stocks Trading Index



BASE FOR EACH TRADING INDEX: 100 as of 3/1/68

Computerworld Stock Trading Summary

NEW YORK AND AMERICAN STOCK EXCHANGE CLOSING PRICES, FRIDAY, JULY 17;
OVER THE COUNTER AND NATIONAL STOCK EXCHANGE, THURSDAY, JULY 16

SUPPLIES & ACCESSORIES

EXCH	1970 RANGE	CLOSING PRICE		WEEK NET CHANGE	WEEK PERCENT CHANGE
N	15- 8	9 5/8	ADAMS-MILLIS CORP	+ 5/8	+ 6.94
O	21- 11	11 1/2	BALTIMORE BUS FORM	- 1/2	- 4.17
A	25- 6	8 5/8	BARRY WRIGHT	+ 1 1/8	+ 15.00
A	35- 15	---	DATA DOCUMENTS	---	----
N	19- 11	12 1/4	ENNIS BUS. FORMS	+ 3/8	+ 3.16
O	17- 8	8 3/4	GRAPHIC CONTROLSCORP	- 1/4	- 2.78
N	166- 52	54 1/2	MEMOREX	- 6 1/8	- 10.10
N	114- 71	79 3/4	3M COMPANY	+ 5	+ 6.69
O	38- 27	29 3/8	MOORE BUS FORMS	+ 7/8	+ 3.07
N	43- 21	25	NASHUA CORP.	+ 1	+ 4.17
O	48- 25	27 1/2	REYNOLDS & REYNOLD	+ 2	+ 7.84
O	30- 20	20 3/4	STANDARD REGISTER	---	----
N	39- 22	23 1/2	UARCO	+ 1 1/4	+ 5.62
A	30- 8	9	WABASH MAGNETICS	- 1/8	- 1.37
O	41- 25	30 1/4	WALLACE BUS FORMS	+ 1 1/4	+ 4.31

COMPUTER SYSTEMS

EXCH	1970 RANGE	CLOSING PRICE		WEEK NET CHANGE	WEEK PERCENT CHANGE
N	172- 78	93 1/2	BURROUGHS CORP	+ 4 1/4	+ 4.76
N	37- 9	10 3/4	COLLINS RADIO	- 1 3/8	- 11.34
N	122- 29	30 3/8	CONTROL DATA CORP	- 3 1/2	- 10.33
A	124- 50	53 7/8	DIGITAL EQUIPMENT	+ 5/8	+ 1.17
N	11- 3	4 1/8	ELECTRONIC ASSOC.	---	----
A	14- 3	4 1/8	ELECTRONIC ENGINEER.	---	----
N	39- 18	19	FOXBORO	+ 1/2	+ 2.70
O	42- 9	11 1/2	GENERAL AUTOMATION	+ 2	+ 21.05
N	77- 60	76 5/8	GENERAL ELECTRIC	+ 5	+ 6.98
N	45- 20	22	HEWLETT-PACKARD CO	- 1 1/4	- 5.38
N	152- 65	75 3/8	HONEYWELL INC	+ 5 7/8	+ 8.45
N	387-237	259 1/2	IBM	+ 9 1/4	+ 3.70
N	86- 34	35 1/8	NCR	- 3 1/4	- 8.47
N	34- 18	19 1/2	RCA	+ 1/2	+ 2.63
N	33- 16	19 1/4	RAYTHEON CO	- 1/2	- 2.53
O	8- 1	1 7/8	SCI. CONTROL CORP.	- 1/8	- 6.25
N	40- 24	26 1/4	SPERRY RAND	---	----
A	49- 10	13	SYSTEMS ENG. LABS	+ 3/4	+ 6.12
N	29- 9	11 1/8	VARIAN ASSOCIATES	+ 3/8	+ 3.49
A	51- 18	21	WANG LABS.	- 1	- 4.55
N	115- 70	76	XEROX CORP	+ 7/8	+ 1.16

LEASING COMPANIES

EXCH	1970 RANGE	CLOSING PRICE		WEEK NET CHANGE	WEEK PERCENT CHANGE
O	9- 4	4 1/2	BANISTER CONTIN	- 1/8	- 2.70
O	25- 9	10	BOOTHE COMPUTER	+ 1/4	+ 2.56
O	8- 3	3 1/2	BRESNAHAN COMP.	---	----
O	8- 2	5	COMPUTER EXCHANGE	+ 1/2	+ 11.11
O	18- 4	---	COMPUTER LEASING	---	----
O	15- 2	---	CYBER-TRONICS	---	----
N	32- 6	8 1/2	DATA PROC. F & G	- 1/2	- 5.56
O	8- 2	2 3/4	DATRONIC RENTAL	- 1/4	- 8.33
A	24- 10	12 1/2	DEARBORN COMPUTER	---	----
O	8- 2	3 1/4	DIEBOLD COMP. LEAS.	+ 3/8	+ 13.04
A	10- 3	3 7/8	DPA. INC.	- 3/8	- 8.82
A	22- 7	11	GRANITE MGT	+ 1/4	+ 2.33
A	44- 5	6	GREYHOUND COMPUTER	- 1/4	- 4.00
N	30- 7	8 5/8	LEASCO DATA PROC.	+ 1/4	+ 2.99
O	5- 2	3	LECTRO COMP LEAS	---	----
A	19- 3	4 1/2	LEVIN-TOWNSEND CMP	- 1 7/8	- 29.41
O	3- 1	1 1/4	LMC DATA, INC.	- 1/8	- 9.09
O	4- 1	1 1/2	MANAGEMENT ASSIST	---	----
O	8- 3	4 1/8	NCC LEASING	+ 1/8	+ 3.12
O	8- 2	2 3/4	SYSTEM CAPITAL	---	----
A	19- 3	12 1/4	U.S. LEASING	+ 1 1/8	+ 10.11

PERIPHERALS & SUBSYSTEMS

EXCH	1970 RANGE	CLOSING PRICE		WEEK NET CHANGE	WEEK PERCENT CHANGE
N	62- 21	28	ADDRESSOGRAPH-MULT	+ 2 5/8	+ 10.34
O	15- 2	3 3/8	ALPHANUMERIC	+ 1/4	+ 8.00
N	48- 13	16 1/2	AMPEX CORP	+ 3/4	+ 4.76
A	34- 5	5 1/2	ASTRODATA	- 1	- 15.38
O	11- 3	6 1/4	BOLT,BERANEK & NEW	- 1/4	- 3.85
N	14- 6	7	BUNKER-RAMO	- 1/8	- 1.75
A	33- 13	14 3/4	CALCOMP	- 1	- 6.35
O	13- 3	3 3/4	COGNITRONICS	- 1/4	- 6.25
O	12- 4	5	COLORADO INST.	---	----
O	36- 8	8	COMPUTER COMMUN.	---	----
A	12- 3	4 5/8	COMPUTER EQUIPMENT	+ 3/4	+ 19.35
A	28- 13	17 3/4	COMPUTEST	+ 1/2	+ 2.90
A	35- 7	8 3/8	DATA PRODUCTS CORP	+ 1/2	+ 6.35
O	23- 6	6 3/4	DATA TECHNOLOGY	---	----
O	13- 5	5 3/4	DIGITRONICS	---	----
N	40- 7	8	ELECTRONIC M & M	- 1 1/4	- 13.51
O	8- 3	4	FABRI-TEK	- 1/8	- 3.03
O	17- 2	2 3/8	FARRINGTON MFG	- 1/8	- 5.00
O	20- 5	5 1/2	INFORMATION DIS	---	----
A	67- 14	15 5/8	MARSHALL INDUSTRIES	- 5/8	- 3.85
A	84- 15	19 3/8	MILGO ELECTRONICS	+ 1	+ 5.44
N	87- 19	22 1/2	MOHAWK DATA SCI.	- 1/8	- 0.55
O	52- 15	16 1/2	OPTICAL SCANNING	+ 1	+ 6.45
O	17- 4	4 7/8	PHOTON	---	----
O	4- 1	1 7/8	PHOTO-MAGNETIC SYS.	+ 1/4	+ 15.38
A	42- 16	17 1/4	POTTER INSTRUMENT	- 1 1/8	- 6.12
O	25- 7	10 1/2	PRECISION INST.	+ 1 1/4	+ 13.51
O	83- 15	17 1/2	RECOGNITION EQUIP	- 1	- 5.41
O	34- 5	5 1/4	REDCOR CORP.	---	----
N	29- 7	9 1/2	SANDERS ASSOCIATES	+ 7/8	+ 10.14
O	53- 7	7 1/2	SCAN DATA	+ 1/2	+ 7.14
O	23- 10	12 1/2	TALLY CORP.	---	----
N	25- 11	13 1/8	TELEX	- 1/8	- 0.94
O	50- 6	8	VIATRON	+ 1 1/8	+ 16.36

SOFTWARE & EDP SERVICES

EXCH	1970 RANGE	CLOSING PRICE		WEEK NET CHANGE	WEEK PERCENT CHANGE
O	6- 1	1 3/4	ADVANCED COMP TECH	- 1/4	- 12.50
A	24- 4	4 3/4	APPLIFD DATA RES.	---	----
O	18- 2	3	APPLIED LOGIC	- 1/4	- 7.69
O	8- 1	1 3/4	ARIES	---	----
A	47- 23	31	AUTOMATIC DATA PRC	+ 1/2	+ 1.64
O	14- 5	6	AUTO SCIENCES	+ 3/4	+ 14.29
O	9- 1	2 3/4	BRANDON APPL SYS	+ 3/4	+ 37.50
O	3- 1	1 3/8	COMPUTER AGE INDUS.	- 1/8	- 8.33
A	12- 2	3	COMPUTER APPL	---	----
O	14- 2	2 3/4	COMPUTER ENVIRON	- 1/4	- 8.33
N T	10- 2	5	COMPUTER INDUS.	---	----
O	13- 2	7	COMPUTER NETWORK	+ 2 1/4	+ 47.37
O	15- 5	6 1/2	COMP. PROPERTY	---	----
N	34- 7	8 7/8	COMPUTER SCIENCES	- 7/8	- 8.97
O	8- 3	3 1/2	COMPUTER USAGE	---	----
A	75- 16	22 1/2	COMPUTING & SOFT	+ 2	+ 9.76
O	9- 2	2 5/8	COMRESS	+ 1/8	+ 5.00
O	14- 2	3 1/4	COMSHARE	---	----
O	3- 1	1 1/8	CONSOL. ANAL. CENT.	---	----
O	24- 3	3	DATA AUTOMATION	- 1/4	- 7.69
O	28- 5	6 3/4	DATA PACKAGING	+ 1 1/2	+ 28.57
O	6- 1	1 1/2	DATAMATION SERVICE	+ 1/8	+ 9.09
O	9- 4	5 1/4	DATATAB	+ 1/4	+ 5.00
O	4- 1	2 1/8	DIGITEK	- 1/8	- 5.56
O	13- 5	5 1/2	EDP RESOURCES	---	----
A	11- 5	5 3/4	ELECT COMP PROG	- 1 1/4	- 17.86
O	161- 31	45	ELECTRONIC DATA SYS.	+ 6	+ 15.38
O	20- 4	5 3/4	INFORMATICS	+ 3/4	+ 15.00
A	25- 6	9	ITEL	+ 1/4	+ 2.86
O	13- 1	---	LEVIN-TOWNSEND SERV.	---	----
A	25- 9	10	MANAGEMENT DATA	- 3/4	- 6.98
O	8- 2	3 1/4	NAT COMP ANALYSTS	+ 1 1/4	+ 62.50
O	12- 3	6 3/4	NAT.COMP. SERV.	+ 1/4	+ 3.85
N	54- 13	16 3/4	PLANNING RESEARCH	- 1/2	- 2.90
O	27- 9	9 1/2	PROGRAMMING METHODS	- 1	- 9.52
O	5- 2	2 1/2	PROGRAMMING & SYS	- 1/4	- 9.09
O	33- 2	2 5/8	PROGRAMMING SCIENCES	- 1/8	- 4.55
N	22- 2	3	SCIENTIFIC RESOURCES	- 1/8	- 4.00
O	2- 1	1	SOFTWARE SYSTEMS	---	----
O	27- 6	6 1/2	TBS COMP CENT INC.	- 1/2	- 7.14
O	4- 1	1 1/2	UNITED DATA CENTER	- 5/8	- 29.41
N	99- 19	22 5/8	UNIVERSITY COMP.	+ 1/8	+ 0.56
A	20- 4	6 1/4	URS SYSTEMS	+ 1 1/8	+ 21.95
O	13- 3	3 1/2	U.S. TIME SHARING	- 1/8	- 3.45

Acquisitions

Information Machines Corp. (IMC), Santee, Calif., has agreed in principle to acquire **Century Computer**, based in Elk Grove Village, Ill. Century Computer will be an autonomous division of IMC, and will provide necessary programs and data handling to convert information collected by IMC's Registron systems into management reports.

Analysis and Programming Corp. has acquired the Washington operation of **Levin-Townsend Service Corp.** The operation was a subsidiary of the Levin-Townsend Computer Corp., an EDP equipment leasing organization.

The Medical Scientific International Corp. has acquired **Hospital Computer Consultants, Inc.**, and its subsidiaries as MSI Group Companies. The terms of the agreement were not disclosed.

Cummins Engine Co.'s acquisition of **Management Information Systems, Inc.** was finalized in an exchange of 18 shares of Cummins stock for each 100 shares of MIS stock. The number of MIS shares outstanding and reserved for options is 532,035.

Computer Learning and Systems Corp. of Chevy Chase, Maryland, has reached agreement on the acquisition of the **Institute of Computer Management, Inc.** Terms of the transaction were not disclosed.

Datatab, Inc. acquired the **Marshall Data Processing Center**, Encino, Calif. The purchase was made for an undisclosed amount of cash and will not dilute Datatab's common stock, it was reported.

Automatic Data Processing, Inc. has reached an agreement in principle to acquire **Delta Data Processing, Inc.** of San Jose, Calif., a privately owned seven-year-old data processing firm, servicing the greater San Francisco market. The terms of the agreement call for Delta Data to be acquired for an undisclosed amount of stock and accounted for on a "pooling-of-interests" basis.

General Analytics Corp. has made a proposal to acquire all the outstanding stock of **Republic Data Systems Corp.**, a computer services subsidiary of Republic Corp., a California-based manufacturing and services organization. General Analytics Corp. will operate the newly acquired subsidiary under the name, General Analytics Data Services.

System Development Corp., Washington, D.C., sold its interest in a jointly owned subsidiary which it held with **Doxiadis Associates, Inc.** The latter firm has taken over the organization and will operate it under the name of Doxiadis Urban Systems, Inc. Both parent firms will continue their individual activities in these fields.

An agreement to merge two companies in the medical computer field has been reached by **General Hospital Communications, Inc.**, London, Ohio, and **Automated Medical Systems, Inc.** of Minneapolis, Minn. The surviving corporation would be Automated Medical Systems.